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ABSTRACT

With this Career and Technology Studies (CTS) curriculum guide, secondary students in Alberta can do the following; develop skills that can be applied in their daily lives; refine career-planning skills; develop technology-related skills in construction; enhance employability skills, especially in construction industries; and apply and reinforce learning developed in other subject areas. The curriculum is organized in strands and modules. This guide encompassing the construction technologies strand contains 46 modules that define what a student is expected to know and be able to do (competencies). The guide is organized in the following parts: (1) program rationale and philosophy, learner expectations, program organization, curriculum and assessment standards, and types of competencies in career and technology studies; (2) strand rationale and philosophy and strand organization for construction technologies; (3) planning for instruction for career and technology studies and for construction technology courses; (4) module curriculum and assessment standards for introductory level construction technologies competencies; (5) module curriculum and assessment standards for intermediate level construction technologies competencies; (6) module curriculum and assessment standards for advanced level construction technologies competencies; (7) assessment tools; (8) linkages and transitions; (9) learning resource guide; and (10) sample student learning guides. Modules cover the following broad topics: tools and materials; building construction; project management; mold making and casting; site preparation; framing; roofs; exterior finishing; electrical, plumbing, and climate control systems; furniture making; cabinetmaking; concrete; masonry; wall and ceiling finishing; stairs; floorcovering; energy-efficient housing; renovations; and project and production management. (KC)

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ED 411 410

CAREER & TECHNOLOGY STUDIES

COMMUNITY HEALTH

GUIDE TO STANDARDS AND IMPLEMENTATION

1997

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This document supersedes all previous versions of the *Career & Technology Studies Guide to Standards and Implementation*.

This publication is a support document. The advice and direction offered is suggestive except where it duplicates the Program of Studies. The Program of Studies—a prescriptive description of the expectations of student learning, focusing on what students are expected to know and be able to do—is issued under the authority of the Minister of Education pursuant to section 25(1) of the *School Act*, Statutes of Alberta, 1988, Chapter S-3.1 as amended, and is required for implementation. **Within this document, the Program of Studies is shaded so that the reader may readily identify all prescriptive statements or segments.**

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CAREER AND TECHNOLOGY STUDIES

A. PROGRAM RATIONALE AND PHILOSOPHY

Through Career and Technology Studies (CTS), secondary education in Alberta is responding to the many challenges of modern society, helping young people develop daily living skills and nurturing a flexible, well-qualified work force.

In Canada's information society, characterized by rapid change in the social and economic environment, students must be confident in their ability to respond to change and successfully meet the challenges they face in their own personal and work lives. In particular, they make decisions about what they will do when they finish high school. Many students will enter the work force, others will continue their education. All students face the challenges of growing independence and responsibility, and of entering post-secondary programs and/or the highly competitive workplace.

Secondary schools also face challenges. They must deliver, on a consistent basis, high quality, cost-effective programs that students, parents and the community find credible and relevant.

CTS helps schools and students meet these challenges. Schools can respond more efficiently and effectively to student and community needs and expectations by taking advantage of the opportunities in the CTS curriculum to design courses and access school, community and distance learning resources. Students can develop the confidence they need as they move into adult roles by assuming increased responsibility for their learning; cultivating their individual talents, interests and abilities; and by defining and acting on their goals.

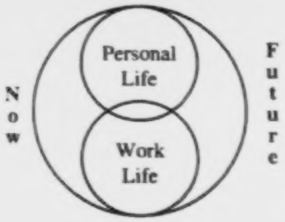
As an important component of education in Alberta secondary schools, CTS promotes student achievement by setting clear expectations and recognizing student success. Students in CTS develop competencies—the knowledge, skills and attitudes they are expected to demonstrate, that is, what they know and what they are able to do.

Acquired competencies can be applied now and in the future as students make a smooth transition into adult roles in the family, community, workplace and/or further education. To facilitate this transition, clearly stated expectations and standards have been defined in cooperation with teachers, business and industry representatives and post-secondary educators.

CTS offers all students important learning opportunities. Regardless of the particular area of study chosen, ***students*** in CTS ***will***:

- develop skills that can be applied in their daily lives, now and in the future
- refine career-planning skills
- develop technology-related skills
- enhance employability skills
- apply and reinforce learnings developed in other subject areas.

In CTS, students build skills they can apply in their everyday lives. For example, in the CTS program, particularly at the introductory levels, students have the opportunity to improve their ability to make sound consumer decisions and to appreciate environmental and safety precautions.

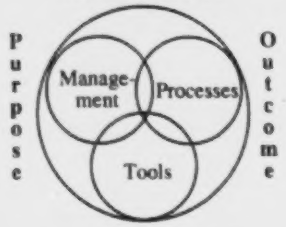

CAREERS

A career encompasses more than activities just related to a person's job or occupation; it involves one's personal life in both local and global contexts; e.g., as a family member, a friend, a community volunteer, a citizen of the world.

The integration of careers throughout the CTS program helps students to make effective career decisions and to target their efforts. CTS students will have the opportunity to expand their knowledge about careers, occupations and job opportunities, as well as the education and/or training requirements involved. Also, students come to recognize the need for lifelong learning.

Students in CTS have the opportunity to use and apply technology and systems effectively and efficiently. This involves:

- a decision regarding which processes and procedures best suit the task at hand
- the appropriate selection and skilled use of the tools and/or resources available
- an assessment of and management of the impact the use of the technology may have on themselves, on others and on the environment.


TECHNOLOGY

Integrated throughout CTS are employability skills, those basic competencies that help students develop their personal management and social skills. Personal management skills are improved as students take increased responsibility for their learning, design innovative solutions to problems and challenges, and manage resources effectively and efficiently. Social skills improve through learning experiences that require students to work effectively with others, demonstrate teamwork and leadership, and maintain high standards in safety and accountability.

As well as honing employability skills, CTS reinforces and enhances learnings developed in core and other complementary courses. The curriculum emphasizes, as appropriate, the effective application of communication and numeracy skills.

In addition to the common outcomes described above, students focusing on a particular area of study will develop career-specific competencies that support entry into the workplace and/or related post-secondary programs. Career-specific competencies can involve understanding and applying appropriate terminology, processes and technologies related to a specific career, occupation or job.

GENERAL LEARNER EXPECTATIONS

General learner expectations describe the basic competencies integrated throughout the CTS program.

Within an applied context relevant to personal goals, aptitudes and abilities; *the student* in CTS *will*:

- demonstrate the basic knowledge, skills and attitudes necessary for achievement and fulfillment in personal life
- develop an action plan that relates personal interests, abilities and aptitudes to career opportunities and requirements
- use technology effectively to link and apply appropriate tools, management and processes to produce a desired outcome
- develop basic competencies (employability skills), by:
  - selecting relevant, goal-related activities, ranking them in order of importance, allocating necessary time, and preparing and following schedules (managing learning)
  - linking theory and practice, using resources, tools, technology and processes responsibly and efficiently (managing resources)
  - applying effective and innovative decision-making and problem-solving strategies in the design, production, marketing and consumption of goods and services (problem solving and innovation)
  - demonstrating appropriate written and verbal skills, such as composition, summarization and presentation (communicating effectively)
  - participating as a team member by working cooperatively with others and contributing to the group with ideas, suggestions and effort (working with others)
  - maintaining high standards of ethics, diligence, attendance and punctuality, following safe procedures consistently, and recognizing and eliminating potential hazards (demonstrating responsibility).

PROGRAM ORGANIZATION

CURRICULUM STRUCTURE

Career and Technology Studies is organized into **strands** and **modules**.

Strands in CTS define competencies that help students:

- build daily living skills
- investigate career options
- use technology (managing, processes, tools) effectively and efficiently
- prepare for entry into the workplace and/or related post-secondary programs.

In general, strands relate to selected industry sectors offering positive occupational opportunities for students. Some occupational opportunities require further education after high school, and some allow direct entry into the workplace. Industry sectors encompass goods-producing industries, such as agriculture, manufacturing and construction; and service-producing industries, such as business, health, finance and insurance.

Modules are the building blocks for each strand. They define what a student is expected to know and be able to do (exit-level *competencies*). Modules also specify prerequisites. Recommendations for module parameters, such as instructional qualifications, facilities and equipment can be found in the guides to implementation.

The competencies a student must demonstrate to achieve success in a module are defined through the *module learner expectations*. Senior high school students who can demonstrate the module learner expectations; i.e., who have the designated competencies, will qualify for one credit toward their high school diploma.

Specific learner expectations provide a more detailed framework for instruction. Within the context of module learner expectations, the specific learner expectations further define the knowledge, skills and attitudes the student should acquire.

The following chart shows the 22 strands that comprise the CTS program and the number of modules available in each strand.

Strand	No. of Modules
1. Agriculture	33
2. Career Transitions	28
3. Communication Technology	33
4. Community Health	31
5. Construction Technologies	46
6. Cosmetology	58
7. Design Studies	31
8. Electro-Technologies	37
9. Energy and Mines	26
10. Enterprise and Innovation	8
11. Fabrication Studies	41
12. Fashion Studies	29
13. Financial Management	14
14. Foods	37
15. Forestry	21
16. Information Processing	48
17. Legal Studies	13
18. Logistics	12
19. Management and Marketing	19
20. Mechanics	54
21. Tourism Studies	24
22. Wildlife	17

LEVELS OF ACHIEVEMENT

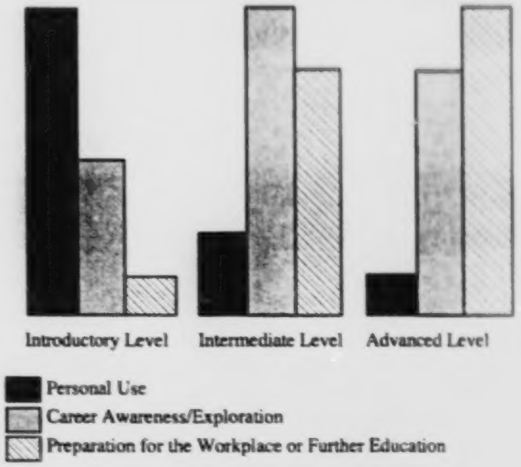
Modules are organized into three levels of achievement: **introductory**, **intermediate** and **advanced**. As students progress through the levels, they will be expected to meet higher standards and demonstrate an increased degree of competence, in both the general learner expectations and the module learner expectations.

Introductory level modules help students build daily living skills and form the basis for further learning. Introductory modules are for students who have no previous experience in the strand.

Intermediate level modules build on the competencies developed at the introductory level. They provide a broader perspective, helping students recognize the wide range of related career opportunities available within the strand.

Advanced level modules refine expertise and help prepare students for entry into the workplace or a related post-secondary program.

The graph below illustrates the relative emphasis on the aspects of career planning at each of the levels.



CURRICULUM AND ASSESSMENT STANDARDS

Curriculum standards in CTS define what students must know and be able to do. Curriculum standards are expressed through general learner expectations for CTS, and through module and specific learner expectations for each strand.

Assessment standards define how student performance is to be judged. In CTS, each assessment standard defines the conditions and criteria to be used for assessing the competencies of each module learner expectation. To receive credit for a module, students must demonstrate competency at the level specified by the conditions and criteria defined for each module learner expectation.

Students throughout the province receive a fair and reliable assessment as they use the standards to guide their efforts, thus ensuring they participate more effectively and successfully in the learning and assessment process. Standards at advanced levels are, as much as possible, linked to workplace and post-secondary entry-level requirements.

TYPES OF COMPETENCIES

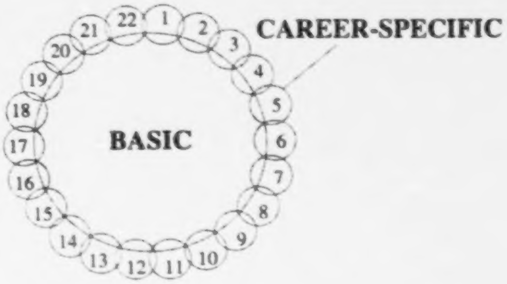
Two types of competencies are defined within the CTS program: basic and career-specific.

Basic competencies are generic to any career area and are developed within each module. Basic competencies include:

- personal management; e.g., managing learning, being innovative, ethics, managing resources
- social; e.g., communication, teamwork, leadership and service, demonstrating responsibility (safety and accountability).

Career-specific competencies relate to a particular strand. These competencies build daily living skills at the introductory levels and support the smooth transition to the workplace and/or post-secondary programs at the intermediate and advanced levels.

The model below shows the relationship of the two types of competencies within the 22 strands of the CTS program.



BASIC COMPETENCIES REFERENCE GUIDE

The chart below outlines basic competencies that students endeavour to develop and enhance in each of the CTS strands and modules. Students' basic competencies should be assessed through observations involving the student, teacher(s), peers and others as they complete the requirements for each module. In general, there is a progression of task complexity and student initiative as outlined in the Developmental Framework*. **As students progress through Stages 1, 2, 3 and 4 of this reference guide, they build on the competencies gained in earlier stages**. Students leaving high school should set themselves a goal of being able to demonstrate Stage 3 performance.

Suggested strategies for classroom use include:

- having students rate themselves and each other
- using in reflective conversation between teacher and student
- highlighting areas of strength
- tracking growth in various CTS strands
- highlighting areas upon which to focus
- maintaining a student portfolio.

Stage 1— *The student:*	**Stage 2**— *The student:*	**Stage 3**— *The student:*	**Stage 4**— *The student:*
Managing Learning			
☐ comes to class prepared for learning	☐ ——→——→	☐ ——→——→	☐ ——→——→
☐ follows basic instructions, as directed	☐ follows instructions, with limited direction	☐ follows detailed instructions on an independent basis	☐ ——→——→
	☐ sets goals and establishes steps to achieve them, with direction	☐ sets clear goals and establishes steps to achieve them	☐ demonstrates self-direction in learning, goal setting and goal achievement
☐ acquires specialized knowledge, skills and attitudes	☐ applies specialized knowledge, skills and attitudes in practical situations	☐ transfers and applies specialized knowledge, skills and attitudes in a variety of situations	☐ transfers and applies learning in new situations; demonstrates commitment to lifelong learning
☐ identifies criteria for evaluating choices and making decisions	☐ identifies and applies a range of effective strategies for solving problems and making decisions	☐ uses a range of critical thinking skills to evaluate situations, solve problems and make decisions	☐ thinks critically and acts logically to evaluate situations, solve problems and make decisions
☐ uses a variety of learning strategies	☐ explores and uses a variety of learning strategies, with limited direction	☐ selects and uses effective learning strategies	☐ ——→——→
		☐ cooperates with others in the effective use of learning strategies	☐ provides leadership in the effective use of learning strategies
Managing Resources			
☐ adheres to established timelines; uses time/schedules/planners effectively	☐ creates and adheres to timelines, with limited direction; uses time/schedules/planners effectively	☐ creates and adheres to detailed timelines on an independent basis; prioritizes task; uses time/schedules/planners effectively	☐ creates and adheres to detailed timelines; uses time/schedules/planners effectively; prioritizes tasks on a consistent basis
☐ uses information (material and human resources), as directed	☐ accesses and uses a range of relevant information (material and human resources), with limited direction	☐ accesses a range of information (material and human resources), and recognizes when additional resources are required	☐ uses a wide range of information (material and human resources) in order to support and enhance the basic requirement
☐ uses technology (facilities, equipment, supplies), as directed, to perform a task or provide a service	☐ uses technology (facilities, equipment, supplies), as appropriate, to perform a task or provide a service, with minimal assistance and supervision	☐ selects and uses appropriate technology (facilities, equipment, supplies) to perform a task or provide a service on an independent basis	☐ recognizes the monetary and intrinsic value of managing technology (facilities, equipment, supplies)
☐ maintains, stores and/or disposes of equipment and materials, as directed	☐ maintains, stores and/or disposes of equipment and materials, with limited assistance	☐ maintains, stores and/or disposes of equipment and materials on an independent basis	☐ demonstrates effective techniques for managing facilities, equipment and supplies
Problem Solving and Innovation			
☐ participates in problem solving as a process ☐ learns a range of problem-solving skills and approaches	☐ identifies the problem and selects an appropriate problem-solving approach, responding appropriately to specified goals and constraints	☐ thinks critically and acts logically in the context of problem solving	☐ identifies and resolves problems efficiently and effectively
☐ practices problem-solving skills by responding appropriately to a clearly defined problem, specified goals and constraints, by: – generating alternatives – evaluating alternatives – selecting appropriate alternative(s) – taking action	☐ applies problem-solving skills to a directed or a self-directed activity, by: – generating alternatives – evaluating alternatives – selecting appropriate alternative(s) – taking action	☐ transfers problem-solving skills to real-life situations, by generating new possibilities ☐ prepares implementation plans ☐ recognizes risks	☐ identifies and suggests new ideas to get the job done creatively, by: – combining ideas or information in new ways – making connections among seemingly unrelated ideas – seeking out opportunities in an active manner

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Stage 1— *The student:*	**Stage 2—** *The student:*	**Stage 3—** *The student:*	**Stage 4—** *The student:*
Communicating Effectively			
☐ uses communication skills; e.g., reading, writing, illustrating, speaking	☐ communicates thoughts, feelings and ideas to justify or challenge a position, using written, oral and/or visual means	☐ prepares and effectively presents accurate, concise, written, visual and/or oral reports providing reasoned arguments	☐ negotiates effectively, by working toward an agreement that may involve exchanging specific resources or resolving divergent interests
☐ uses language in appropriate context	☐ uses technical language appropriately	☐ encourages, persuades, convinces or otherwise motivates individuals	☐ negotiates and works toward a consensus
☐ listens to understand and learn	☐ listens and responds to understand and learn	☐ listens and responds to understand, learn and teach	☐ listens and responds to understand, learn, teach and evaluate
☐ demonstrates positive interpersonal skills in selected contexts	☐ demonstrates positive interpersonal skills in many contexts	☐ demonstrates positive interpersonal skills in most contexts	☐ promotes positive interpersonal skills among others
Working with Others			
☐ fulfills responsibility in a group project	☐ → →	☐ seeks a team approach, as appropriate, based on group needs and benefits; e.g., idea potential, variety of strengths, sharing of workload	☐ leads, where appropriate, mobilizing the group for high performance
☐ works collaboratively in structured situations with peer members	☐ cooperates to achieve group results	☐ works in a team or group: – encourages and supports team members – helps others in a positive manner – provides leadership/followership as required – negotiates and works toward consensus as required	☐ understands and works within the context of the group
☐ acknowledges the opinions and contributions of others in the group	☐ maintains a balance between speaking, listening and responding in group discussions ☐ respects the feelings and views of others		☐ prepares, validates and implements plans that reveal new possibilities
Demonstrating Responsibility			
Attendance			
☐ demonstrates responsibility in attendance, punctuality and task completion	☐ → →	☐ → →	☐ → →
Safety			
☐ follows personal and environmental health and safety procedures	☐ recognizes and follows personal and environmental health and safety procedures	☐ establishes and follows personal and environmental health and safety procedures	☐ transfers and applies personal and environmental health and safety procedures to a variety of environments and situations
☐ identifies immediate hazards and their impact on self, others and the environment	☐ identifies immediate and potential hazards and their impact on self, others and the environment	☐ → →	☐ → →
☐ follows appropriate/emergency response procedures	☐ → →	☐ → →	☐ → →
			☐ demonstrates accountability for actions taken to address immediate and potential hazards
Ethics			
☐ makes personal judgements about whether or not certain behaviours/actions are right or wrong	☐ assesses how personal judgements affect other peer members and/or family; e.g., home and school	☐ assesses the implications of personal/group actions within the broader community; e.g., workplace	☐ analyzes the implications of personal/group actions within the global context
			☐ states and defends a personal code of ethics as required

***Developmental Framework**			
• *Simple task* • *Structured environment* • *Directed learning*	• *Task with limited variables* • *Less structured environment* • *Limited direction*	• *Task with multiple variables* • *Flexible environment* • *Self-directed learning, seeking assistance as required*	• *Complex task* • *Open environment* • *Self-directed/self-motivated*

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CONSTRUCTION TECHNOLOGIES

B. STRAND RATIONALE AND PHILOSOPHY

The products of construction and manufacturing are a reflection of the needs and wants of society. For centuries, people have built structures and made objects to provide protection from the elements, to make work easier and to make life more enjoyable.

Today, our social and economic well-being is still closely linked to our ability to transform materials into useful products. Therefore, it is important that as students prepare for their futures, they should understand how the construction and manufacturing industries organize themselves and apply technology in productive ways.

In Alberta, the construction and manufacturing sectors of the economy are characterized by relatively small entrepreneurial businesses that make products for domestic and foreign market needs.

In recent years, dramatic changes have occurred in the way buildings and other products have been designed and built. With the aid of new techniques, architects and engineers are now able to simulate and evaluate designs with extreme accuracy. This precision translates into stronger structures, smaller tolerances, less waste and the need for a highly trained and flexible work force.

Construction Technologies, a strand in Career and Technology Studies, has been developed to help meet this educational need. Students selecting modules from this strand have the opportunity to investigate and develop important knowledge, skills and attitudes relative to the design, construction and maintenance of buildings and other related products.

Students are provided with a broad base of relevant theory and practice that builds daily-living and career-specific skills. Successful completion of modules in this strand is intended to provide students with the skills and experience required for entry-level employment or for pursuing post-secondary education. This preparation is accomplished by encouraging students to:

- develop safe work and environmental practices
- develop self and resource management skills
- work with a variety of technologies and technological systems
- communicate and work as effective team members
- develop ethical work habits and relationships
- creatively seek practical solutions to problems

- develop consumer and life skills

- identify further educational and career opportunities.

Within the philosophy of Career and Technology Studies, *students* in Construction Technologies *will*:

- appreciate the importance of the construction and manufacturing industries in relationship to our personal, social and economic well-being

- demonstrate a working knowledge of materials, tools and processes that are used to create buildings and other related products that meet the needs and wants of society

- apply effective and responsible decision-making skills in the design and construction of buildings and durable goods

- develop positive attitudes toward individual and team work responsibilities, quality production and service

- develop an appreciation for health, safety and environmental issues related to construction and manufacturing

- appreciate the need for legislation and codes that regulate building construction and manufacturing activities

- link, in meaningful and practical ways, the knowledge, skills and attitudes developed in other strands and courses to this strand

- assess personal interests and abilities related to making realistic career choices.

STRAND ORGANIZATION

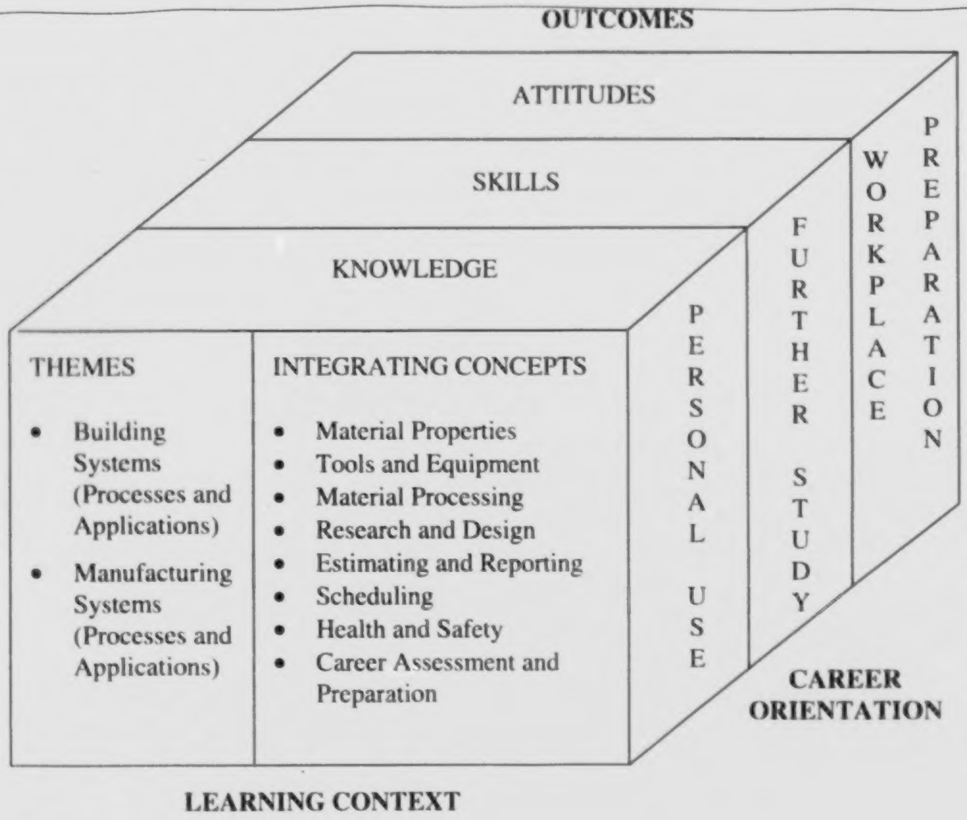
THEMES

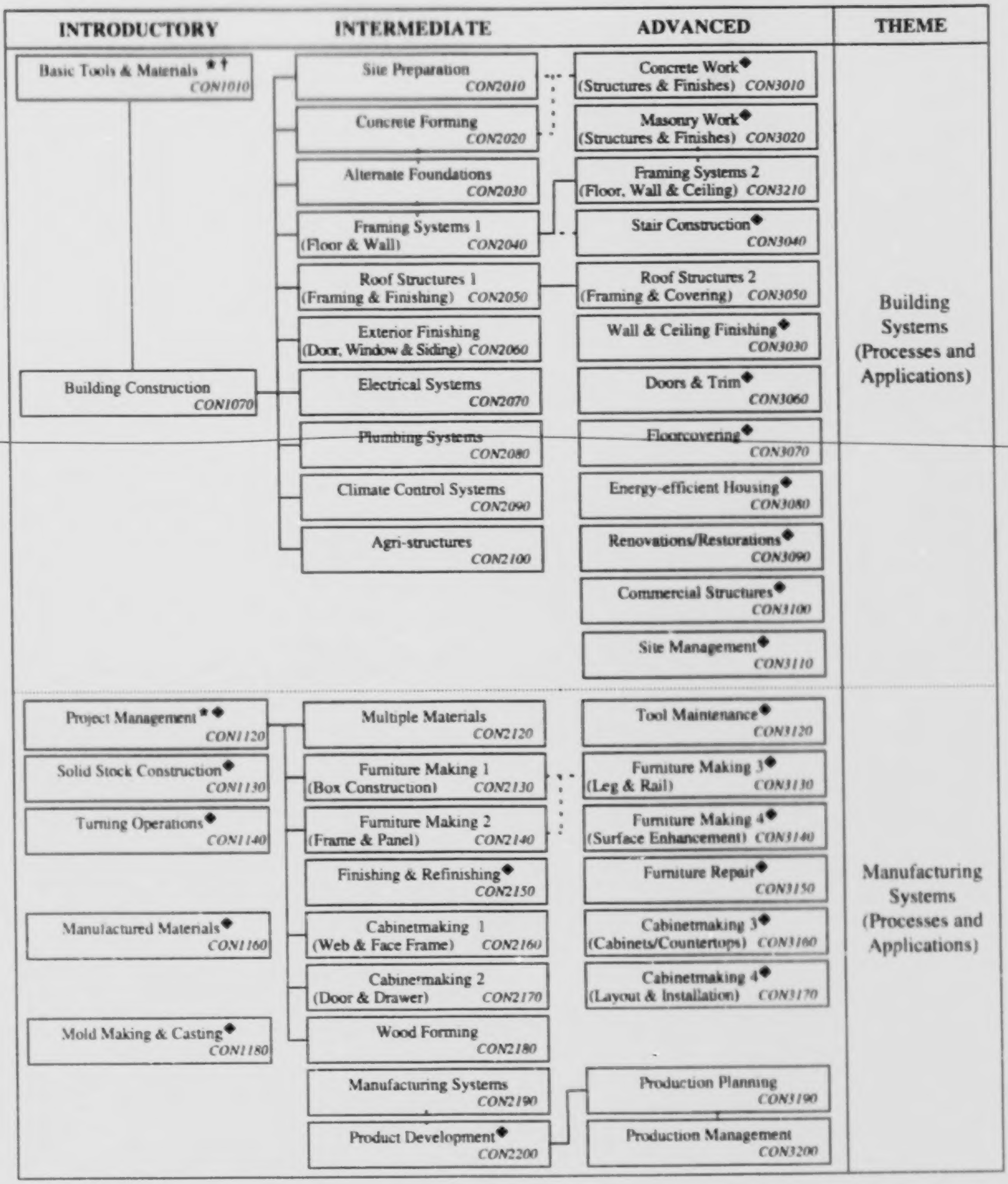
The Construction Technologies model, shown below, has been developed around two themes that are central to the transformation of material into useful products and structures. These themes are:

- Building Systems (Processes and Applications)
- Manufacturing Systems (Processes and Applications).

Integrating concepts, shown on the model, provide a basic framework for the study of each module.

The context in which the learning takes place varies according to the available resources, background experience and intent of the learner. As the student is engaged in the learning activities in the school or in the community, specific outcomes are anticipated. These outcomes take the form of basic and career-specific knowledge, skills and attitudes that have been constructed by the learner.


OUTCOMES
ATTITUDES
SKILLS
KNOWLEDGE
PREPARATION
WORKPLACE
FURTHER STUDY
PERSONAL USE
THEMES
• Building Systems (Processes and Applications)
• Manufacturing Systems (Processes and Applications)
INTEGRATING CONCEPTS
• Material Properties
• Tools and Equipment
• Material Processing
• Research and Design
• Estimating and Reporting
• Scheduling
• Health and Safety
• Career Assessment and Preparation
CAREER ORIENTATION
LEARNING CONTEXT



INTRODUCTORY	INTERMEDIATE	ADVANCED	THEME
Basic Tools & Materials *† CON1010	Site Preparation CON2010	Concrete Work◆ (Structures & Finishes) CON3010	Building Systems (Processes and Applications)
	Concrete Forming CON2020	Masonry Work◆ (Structures & Finishes) CON3020	
	Alternate Foundations CON2030	Framing Systems 2 (Floor, Wall & Ceiling) CON3210	
	Framing Systems 1 (Floor & Wall) CON2040	Stair Construction◆ CON3040	
	Roof Structures 1 (Framing & Finishing) CON2050	Roof Structures 2 (Framing & Covering) CON3050	
	Exterior Finishing (Door, Window & Siding) CON2060	Wall & Ceiling Finishing◆ CON3030	
Building Construction CON1070	Electrical Systems CON2070	Doors & Trim◆ CON3060	
	Plumbing Systems CON2080	Floorcovering◆ CON3070	
	Climate Control Systems CON2090	Energy-efficient Housing◆ CON3080	
	Agri-structures CON2100	Renovations/Restorations◆ CON3090	
		Commercial Structures◆ CON3100	
		Site Management◆ CON3110	
Project Management*◆ CON1120	Multiple Materials CON2120	Tool Maintenance◆ CON3120	Manufacturing Systems (Processes and Applications)
Solid Stock Construction◆ CON1130	Furniture Making 1 (Box Construction) CON2130	Furniture Making 3◆ (Leg & Rail) CON3130	
Turning Operations◆ CON1140	Furniture Making 2 (Frame & Panel) CON2140	Furniture Making 4◆ (Surface Enhancement) CON3140	
	Finishing & Refinishing◆ CON2150	Furniture Repair◆ CON3150	
Manufactured Materials◆ CON1160	Cabinetmaking 1 (Web & Face Frame) CON2160	Cabinetmaking 3◆ (Cabinets/Countertops) CON3160	
	Cabinetmaking 2 (Door & Drawer) CON2170	Cabinetmaking 4◆ (Layout & Installation) CON3170	
Mold Making & Casting◆ CON1180	Wood Forming CON2180		
	Manufacturing Systems CON2190	Production Planning CON3190	
	Product Development◆ CON2200	Production Management CON3200	

——— Prerequisite . . . . Recommended sequence

* Module provides a strong foundation for further learning in this strand.

† Module is also offered in Fabrication Studies.

◆ Refer to specific modules for additional prerequisites.

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MODULE DESCRIPTIONS

Module CFS1010: Basic Tools & Materials
Students develop basic hand tool and production skills to transform, safely, common building materials into useful products.

Module CON1070: Building Construction
Students examine common building systems, and develop basic skills related to building a simple model or full size system/structure.

Module CON1120: Project Management
Students develop basic shop drawing and estimating skills, and apply them to build a product.

Module CON1130: Solid Stock Construction
Students develop basic hand and power tool skills to build a product made from solid wood.

Module CON1140: Turning Operations
Students use wood-turning equipment and techniques to create a faceplate and spindle turning made from solid and/or built-up stock.

Module CON1160: Manufactured Materials
Students select and use the appropriate materials and tools to build a product or structure from a wood composite or other manufactured material.

Module CON1180: Mold Making & Casting
Students apply knowledge of casting and molding materials and processes to prepare a mold and produce a casting.

Module CON2010: Site Preparation
Students develop the knowledge and skills to acquire a building permit and to locate and prepare a site for excavation and foundation work.

Module CON2020: Concrete Forming
Students develop knowledge and skills related to the preparation and construction of a concrete foundation.

Module CON2030: Alternate Foundations
Students develop basic knowledge and skills related to the design and construction of an alternative foundation system.

Module CON2040: Framing Systems 1 (Floor & Wall)
Students develop basic framing knowledge and skills associated with the construction of a floor and wall system.

Module CON2050: Roof Structures 1 (Framing & Finishing)
Students develop basic knowledge and skills associated with framing and finishing a simple roof system.

Module CON2060: Exterior Finishing (Door, Window & Siding)
Students apply and develop basic knowledge of door, window and siding systems and installation skills and procedures.

Module CON2070: Electrical Systems
Students apply electrical principles, and develop an understanding of residential electrical code requirements and installation procedures.

Module CON2080: Plumbing Systems
Students develop basic knowledge and skills to fabricate and make repairs to residential drainage, waste, vent (DWV) and water supply systems.

Module CON2090: Climate Control Systems
Students investigate common heating, ventilating and air conditioning (HVAC) systems and principles, and participate in the installation or maintenance of one of these systems.

Module CON2100: Agri-structures
Students apply construction principles and skills, and use pre-engineered designs to build a structure to be used for agricultural purposes.

Module CON2120: Multiple Materials
Students develop a product that incorporates two or more types of material in its construction.

Module CON2130: Furniture Making 1 (Box Construction)
Students develop basic joinery skills and knowledge related to case construction, by producing a box-type piece of furniture.

Module CON2140: Furniture Making 2 (Frame & Panel)
Students use solid and/or composite materials to build a frame and panel product or component.

Module CON2150: Finishing & Refinishing
Students use knowledge of finishing materials and finishing techniques to apply new and replacement finishes.

Module CON2160: Cabinetmaking 1 (Web & Face Frame)
Students apply web and face frame construction techniques, and use solid and/or manufactured materials to produce a built-in or modular cabinet.

Module CON2170: Cabinetmaking 2 (Door & Drawer)
Students use solid and composite materials to develop skills in building cabinet doors and drawers.

Module CON2180: Wood Forming
Students apply skills in mold making and wood conditioning to make a formed part or component.

Module CON2190: Manufacturing Systems
Students investigate the nature of manufacturing systems used to produce durable goods.

Module CON2200: Product Development
Students work, individually or as team members, to research, design and build a product suitable for mass production and marketing.

Module CON3010: Concrete Work (Structures & Finishes)
Students develop essential skills to form, place and finish a concrete project.

Module CON3020: Masonry Work (Structures & Finishes)
Students develop basic knowledge and skills related to masonry materials, structures and finishes.

Module CON3030: Wall & Ceiling Finishing
Students develop basic knowledge and skills to insulate, install and finish an interior wall/ceiling surface.

Module CON3040: Stair Construction
Students develop the knowledge and skills required to build a straight flight of stairs.

Module CON3050: Roof Structures 2 (Framing & Covering)
Students develop basic competencies in laying out, cutting and assembling common and hip and valley rafters in relation to specialized structures and coverings.

Module CON3060: Doors & Trim
Students apply basic finish carpentry knowledge and skills to install doors, railings and moldings.

Module CON3070: Floorcovering
Students develop skills in selecting and installing typical floor coverings used in residential, institutional and commercial buildings.

Module CON3080: Energy-Efficient Housing
Students investigate construction practices and support systems to create an energy-efficient housing design.

Module CON3090: Renovations/Restorations
Students work with a client to plan and complete a building renovation and/or restoration.

Module CON3100: Commercial Structures
Students investigate structural designs, construction techniques and work site practices related to commercial construction.

Module CON3110: Site Management
Students consider the efficient and timely delivery of a quality product. They investigate and report on site management theories and practices to produce a project management plan.

Module CON3120: Tool Maintenance
Students develop skills in preventive maintenance by routinely inspecting and servicing production tools and equipment.

Module CON3130: Furniture Making 3 (Leg & Rail)
Students use solid and/or manufactured materials and leg-and-rail or pedestal construction techniques to build a free-standing piece of furniture.

Module CON3140: Furniture Making 4 (Surface Enhancement)
Students explore and demonstrate the use of veneer, inlay, carving and/or marquetry techniques to enhance the appearance of a product or component.

Module CON3150: Furniture Repair
Students apply basic knowledge of furniture construction and materials to repair or replace existing components or coverings.

Module CON3160: Cabinetmaking 3 (Cabinet/Countertops)
Students develop the knowledge and skills required to build and install a simple cabinet/countertop complete with an appropriate backsplash and edge treatment.

Module CON3170: Cabinetmaking 4 (Layout & Installation)
Students develop a floor/wall cabinet plan and order and install a set of prebuilt cabinets.

Module CON3190: Production Planning
Students plan, individually or as team members, a production system, and create the necessary work cells and floor plan to produce a given product in a safe and efficient manner.

Module CON3200: Production Management
Students identify and enhance management skills in relation to the development and deployment of people and physical resources.

Module CON3210: Framing Systems 2 (Floor, Wall & Ceiling)
Students develop appropriate layout and assembly skills to install conventional and/or engineered framing components associated with residential and/or light commercial construction.

SECTION C: PLANNING FOR INSTRUCTION

CTS provides increased opportunity for junior and senior high schools to design courses based on the needs and interests of their students and the circumstances within the school and community. Some strands may be appropriately introduced at the junior high school level. Other strands are more appropriately introduced at the senior high school level or to Grade 9 students. Refer to this section for recommendations regarding the Legal Studies strand, or the *Career & Technology Studies Manual for Administrators, Counsellors and Teachers* for a summary of the recommended grade levels for each strand.

PLANNING FOR CTS

Defining Courses

Schools determine which strands and modules will be offered in a particular school, and will combine modules into courses.

Each module was designed for approximately 25 hours of instruction. However, this time frame is only a guideline to facilitate planning. The CTS curricula are competency based, and the student may take more or less time to gain the designated competencies within each module.

A course will usually consist of modules primarily from the same strand but, where appropriate, may include modules from other strands. Refer to the *Career & Technology Studies Manual for Administrators, Counsellors and Teachers* (Appendix 4) for more information on course names and course codes.

Module selection and sequencing should consider:

- prerequisite(s)
- supporting module(s) (other CTS modules that may enhance the learning opportunity if offered with the module)
- module parameters
  - instructional qualifications, if specialized
  - equipment and facility requirements, if specialized.

The module parameters are defined for each module in Sections D, E and F of this Guide.

Degree of Flexibility

The CTS program, while designed using the modular structure to facilitate flexible timetabling and instructional delivery, does not mandate the degree of flexibility a school or teacher will offer. The teacher and school will determine the degree of flexibility available to the student. Within the instructional plan established by the school, the student may:

- be given the opportunity to progress at a rate that is personally challenging
- have increased opportunity to select modules that develop competencies he or she finds most relevant.

Integrating Basic Competencies

The basic competencies relate to managing learning and resources, problem solving and innovation, communicating effectively, working with others and demonstrating responsibility are developed throughout the CTS program, and are within each module.

Assessment of student achievement on the basic competencies is integrated throughout the other module learner expectations. Refer to Section G (Assessment Tools) of this Guide for the description of student behaviours expected at each of the four developmental stages defined for the basic competencies.

Assessment of basic competencies could include input and reflection involving the student, teacher(s), peers and others. Description of the observed behaviour could be provided through a competency profile for the module. Positive, ongoing interaction between the student and teacher will support motivation for student growth and improvement.

Assessing Student Achievement

Assessing student achievement is a process of gathering information by way of observations of process, product and student interaction.

Where appropriate, assessment tools have been defined to assist the teacher and student in the assessment. Refer to Section G (Assessment Tools) of this Guide for copies of the various tools (worksheets, checklists, sample questions, etc.).

A suggested emphasis for each module learner expectation has also been established. The suggested emphasis provides a guideline to help teachers determine time allocation and/or the appropriate emphasis for each MLE and student grade.

Recognizing Student Achievement

At the high school level, successful demonstration of the exit-level competencies in a module qualifies the student for one credit. Refer to Section A of this Guide for more detailed information about how curriculum and assessment standards are defined in CTS. Refer to the *Career & Technology Studies Manual for Administrators, Counsellors and Teachers* (Appendix 12) for more information on how student achievement can be recognized and reported at the school and provincial levels.

Portfolios

When planning for instruction and assessment, consider a portfolio as an excellent tool to provide evidence of a student's effort, progress and achievement. Portfolios will aid students in identifying skills and interest. They also provide the receiving teacher, employer and/or post-secondary institution proof of a student's accomplishments. The make-up and evaluation of the portfolio should be a collaborative agreement between the student and teacher.

Resources

A comprehensive resource base, including print, software and audio-visual, has been identified to support CTS strands. It is intended that these resources form the basis of a resource centre, encouraging teachers and students to access a wide selection of resources and other information sources throughout the learning process. Unless otherwise noted, these resources are considered to be suitable for both junior and senior high school students.

Authorized resources may be obtained from the Learning Resources Distributing Centre or directly from the publisher or distributor. Refer to Section I (Learning Resource Guide) of this Guide for the complete resource list including curriculum correlations and resource annotations. Additional sources refer to noncommercial or government agencies that offer resources that may be of assistance in this strand.

Student Learning Guides

In addition to the resources, sample Student Learning Guides are available (refer to Section J of this Guide). These samples, designed for individual student or small group use, provide an instructional plan for selected modules and include the following components:

- Why take this module?
- What are the entry-level competencies?
- What are the exit-level competencies?
- What resources may be accessed?
- What assignments/activities must be completed?
- What are the timelines?
- How will the final mark be calculated?

Sample Student Learning Guides have been developed for the following modules in Construction Technologies:

- CON1010 Basic Tools & Materials
- CON2010 Site Preparation
- CON3040 Stair Construction.

Community Resources

The community can become a major stakeholder and effective partner in the learning process. The use of community members and resources should be integrated into course planning. Business, industry and government agencies offer a wide range of services and resources, as do local clubs, service groups and institutions. When planning for the use of community resources, teacher should ensure that related presentations, activities and work settings:

- are consistent with student knowledge and skill levels
- demonstrate sound pedagogy
- are exemplary of approved health and safety standards
- provide a balanced approach to curriculum topics and related issues.

Off-Campus Excursions

Field excursions are also recommended and should be an important part of teaching and learning throughout the Construction Technologies stands. Safety must be a prime consideration in planning off-campus learning experiences. Both teachers and students should engage in activities commensurate with their level of training and ability. Adequate instructional support, guidance and supervisor must be provided at all times. Local jurisdiction and school policies must be understood and observed by principals, teachers, parents, supervisors and students.

PLANNING FOR CONSTRUCTION TECHNOLOGIES

The following suggestions are provided to assist teachers, school and school system administrators as they plan to deliver modules from the Construction Technologies strand.

Teaching Strategies

A practical "hands-on" approach, where theory and practice are developed in concert with one another, is encouraged throughout Construction Technologies. When teaching content in an applied setting, lecture-type classes should be avoided as much as possible. Teachers should attempt to integrate theory and practice by engaging students in practical experiences. Students who work on meaningful assignments and useful projects are more easily motivated to develop the required knowledge skills and attitudes outlined in each module. Refer to the *Career & Technology Studies Manual for Administrators, Counsellors and Teachers* (Appendix 9) for additional teaching strategies.

Health and Safety and Related Legislation

The health and safety of students and teachers is protected by law. Every worker has the right to be protected from injury and needs to know how to safely use, store and transport hazardous materials. Teachers of Construction Technologies must ensure that students are working in a safe and healthy environment. Students should therefore be encouraged to work in a safe manner and identify and report existing and potential hazards within the learning environment. Accident prevention is one of the most important concepts a student learns in Construction Technologies strands.

Teachers of Construction Technologies modules should also be aware of the issues address in the *Occupational Health and Safety Act*, Worker's Compensation regulations and local fire and building codes related to this strand.

Off-site Risk Management

Safety and risk management involves exercising situation-specific judgement throughout the course of an off-campus excursion. Judgement is the product of experience, and may include recognizing factors such as dangers imposed by equipment, a decline in physical strength, or a more challenging task. Many of the hazard recognition skills can be taught in the classroom in the preparation stage.

A significant aspect of off-site risk management is group management. Teachers can exercise appropriate group management strategies by focusing attention on:

- pacing and observation distance, including speed of travel, rest stops, distance travelled and maintaining safe distance for observations
- group control, including position of leader, regrouping procedures, signal systems and buddy systems
- the establishment of group rules and norms
- clearly defined task allocations for each student
- objective hazard recognition on the site, including machinery and equipment.

For additional information on health and safety standards in CTS, refer to the *CTS Manual for Administrators, Counsellors and Teachers* (Appendix 13).

Instructional Qualifications

Responsibility for instructional planning and delivery of courses in Construction Technologies will be assumed by Alberta certified teachers. For additional teacher qualifications, refer to the module parameters in each module for the formalized training and certificates requirements for each module. It should be noted that where modules or portions of modules require special instructional qualification, these modules or parts of modules can be delivered off-campus by other qualified individuals.

Many of the competencies developed in Construction Technologies relate directly to a number of recognized trade areas. The *Alberta Apprenticeship and Training Act* clearly outlines who can or cannot work in compulsory and optional trade areas. The act states: *A person shall not work in a compulsory or optional trade area unless that person:*

a. holds a trade certificate
b. is an apprentice in the specified trade
c. is authorized under Section 23 to work or perform one or more tasks in the trade
d. is a student in a student work training program in that trade

In addition, in an optional certificated trade area, a person who does not hold a trade certificate, may work in or perform one or more tasks, activities or functions if the employer is satisfied that the person possesses the skills and knowledge in the trade as would be expected from one who would be in possession of a trade certificate.

It should also be noted that the *Act* spells out the ratio of journeyman to apprentices, which is a minimum of one apprentice to each journeyman employed. This ruling would apply specifically to Registered Apprenticeship Program.

Selecting Modules

Course planning should take into consideration module sequences that link with both physical and human resources present in the school and community.

The scope and sequence chart in Section B of this Guide provides an overview of the Construction Technologies modules, indicating prerequisites and theme areas. In addition, a brief description of each module can be found in this section following the scope and sequence chart.

Construction Technologies in Junior High

Most introductory level modules may be offered to junior high school students. Since resources and expertise will vary in each school and community, it is important to assess potential support networks before selecting specific modules and module sequences.

The number of modules will vary according to the time available throughout Grades 7, 8 and 9 as outlined below:

Time Available	Modules
25 hours	**Basic Tools & Materials**
50 hours	*add to the previous module* **Building Construction**
75 – 100 hours	*add one or two of the following:* **Project Management** **Solid Stock Construction** **Turning Operations** **Mold Making & Casting**

Where appropriate, junior high school students may also become involved in intermediate level modules, particularly in the Manufacturing theme.

Construction Technologies in Senior High

Depending on the interest and intent of the students, modules in Construction Technologies may be clustered in a variety of ways. Students with a general interest in the strand may wish to sample modules from the various themes, while those with specific interests may focus on a cluster of modules related to welding, sheet metal, foundry or machining as outlined in the Scope and Sequence chart.

As in all CTS strands, students will identify, explore and prepare for future career opportunities. It is recommended that course planning include the integration of relevant career investigations throughout each module, rather than in a singular or isolated study. Career profiles, interviews and job shadowing will acquaint students with the many technical and professional careers associated within the field of fabrication.

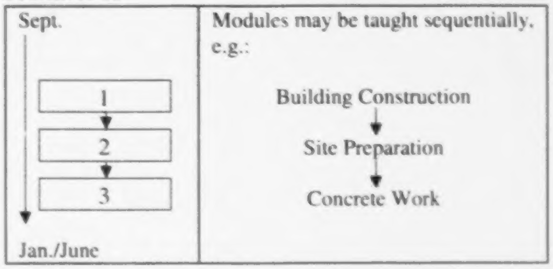
Students intending to continue their studies in a post-secondary institution and/or through apprenticeship should be aware of the post-secondary and apprenticeship linkages referred to in Section H of this Guide. For example, basic to most trade-related programs is the need to have well-developed print reading and hand-tool skills. Such considerations will affect module selection.

Before selecting modules, teachers should check the module parameters outlined in each module (see Sections D, E and F of this Guide).

Module Blocking and Sequencing

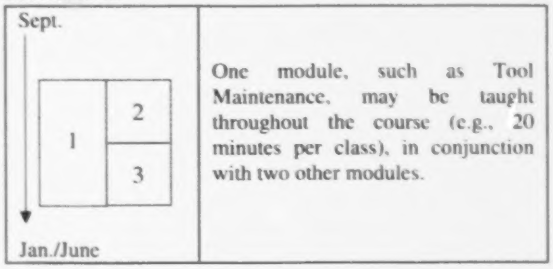
Modules can be delivered sequentially, concurrently or combined as 3-, 5- or 6-credit courses as outlined below:

Scenario A



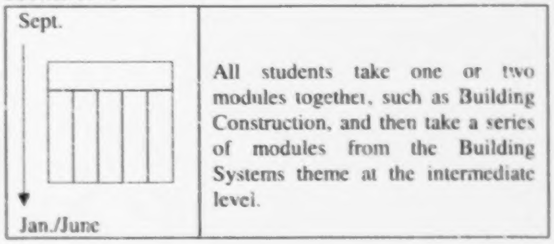
Modules may be taught sequentially, e.g.:

Scenario B



One module, such as Tool Maintenance, may be taught throughout the course (e.g., 20 minutes per class), in conjunction with two other modules.

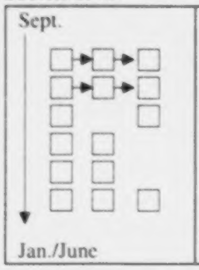
Scenario C



All students take one or two modules together, such as Building Construction, and then take a series of modules from the Building Systems theme at the intermediate level.

Teachers can also allow students to progress at a rate that is personally challenging; e.g.:

Scenario D



From a list of modules defined by the teacher, the students select which ones they will work on and, in consultation with the teacher, establish timelines for completion and submission of assignments, etc.

Identifying Linkages

Section H of this Guide describes some possible linkages between the Construction Technologies strand and:

- other CTS strands
- complementary programs such as art and drama
- core programs, e.g., mathematics, science, social studies and language arts
- off-campus programs.

Note that project modules from the Career Transitions strand may be combined with modules from the Construction Technologies strand to provide increased opportunity for students to develop expertise and refine their competencies.

Project modules are **not** designed to be offered as distinct courses and should **not** be used to extend Work Experience 15, 25 and 35 courses.

Improving Smooth Transitions to the Workplace and/or Post-secondary Programs

As in other CTS strands, students will assess and prepare for future career opportunities. It is recommended that program planning include the integration of relevant career information and experiences. Through the development of career-specific skills, occupational profiles and on-site activities, students become aware of the training requirements and career opportunities related to the fabrication sector of the economy.

Refer to Section H of this Guide for potential transitions students may make into:

- the workplace
- related post-secondary programs or other avenues for further learning.

MODULE CURRICULUM AND ASSESSMENT STANDARDS:

SECTION D: INTRODUCTORY LEVEL

The following pages define the curriculum and assessment standards for the introductory level of Construction Technologies.

Introductory level modules help students build daily living skills and form the basis for further learning. Introductory modules are developed for students who have no previous experience in the strand.

Module learner expectations define the competencies a student must demonstrate to achieve success in a module. Assessment standards define the criteria and conditions to be used for assessing the competencies defined in the module learner expectations.

Specific learner expectations provide a detailed framework for instruction and help students build the competencies defined in the module learner expectations. Additional information and suggestions for instruction are provided in the Notes column; teachers may wish to use this space to record their ideas for instruction or student projects.

Module CON1010: Basic Tools & Materials D.3
Module CON1070: Building Construction D.7
Module CON1120: Project Management D.11
Module CON1130: Solid Stock Construction D.15
Module CON1140: Turning Operations D.19
Module CON1160: Manufactured Materials D.23
Module CON1180: Mold Making & Casting D.27

MODULE CON1010: BASIC TOOLS & MATERIALS

Level: Introductory

Theme: Building Systems (Processes and Applications)

Prerequisite: None

Module Description: Students develop basic hand tool and production skills to transform, safely, common building materials into useful products.

Module Parameters: Access to a materials work centre, complete with basic hand tools.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• identify and describe the safe use of basic hand tools	• the identification and description of 20 basic hand tools used in construction and fabrication to include two or more: – measurement and layout tools – cutting and boring tools – assembly and dismantling tools – abrading and sharpening tools. *Assessment Tool* *Presentations/Reports: Hand Tools, CON1010–1* *Illustrative Example: Hand Tool Presentation, CON1010–2* *Standard* *Correct identification and description of 16 basic hand tools* *Performance rating of 1 for each applicable task*	15
• identify and compare the properties of common materials used in construction and fabrication activities	• a written or oral presentation that compares the properties of four different materials in any two of the following material categories: – solid and manufactured wood products – ferrous and nonferrous metals – thermoforming and thermosetting plastics – clay and concrete products. *Assessment Tool* *Presentations/Reports: Material Identification, CON1010–3* *Standard* *Performance rating of 1 for each applicable task*	15

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MODULE CON1010: BASIC TOOLS & MATERIALS (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• apply construction/ fabrication processes and skills to produce a product	• demonstration of safe construction and fabrication skills to plan, construct/fabricate, assemble and finish a useful product. *Assessment Tool* *Assessment Framework: Project Assessment, CONPRO* *Standard* *The product is made according to the prepared drawing and event sequence, tools and materials are used according to accepted safe practice* *Performance rating of 1 for each applicable task*	70
• demonstrate basic competencies.	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated Throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation		
• Tools and Equipment	• identify and describe basic hand tools that are used to measure, mark, hold, cut, form, fasten and finish materials	Introduce students to the safe use of manually operated and power assisted hand tools.
• Materials	• identify and compare the properties of a variety of common materials used to make artifacts and structures	Discuss reasons for choosing one material over another for a given application.
	• identify common shapes, sizes and forms of construction and fabrication materials	

Concept	Specific Learner Expectations	Notes
	The student should:	
• Health and Safety	• describe appropriate methods to handle, recycle, store and dispose materials • identify and demonstrate the appropriate use of personal protective equipment • identify steps to be taken in the event of an accident	Help students evaluate the short- and long-term impact of the choice of a material on the health of individuals and the environment.
• Production Systems	• outline the typical phases in a production system; e.g.: – planning – constructing/fabricating – assembling – finishing – evaluating.	Compare those activities to the input, process, output and feedback mechanisms described in other technological systems.
Planning and Management • Product Development	• select or modify a plan for a simple product that will meet a defined need • identify and select the appropriate tools, materials and processes required to make the product • list the steps that are required to make a product in a safe and logical order.	Students are more highly motivated if they can choose and personalize a project.
Implementation • Material Processing	• develop basic construction/fabrication skills by building, assembling and finishing a variety of products.	In addition to woods and metals, students should gain experience using a variety of materials such as plastic and earths.
Assessment • Product Quality	• describe ways to improve product quality and productivity	Students should be encouraged to make reflective notes and keep a record of their completed work.
• Career Preparation	• create a record of completed activities within a portfolio.	

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MODULE CON1070: BUILDING CONSTRUCTION

Level: Introductory

Theme: Building Systems (Processes and Applications)

Prerequisite: CON1010 Basic Tools & Materials

Module Description: Students examine common building systems, and develop basic skills related to building a simple model or full-size system/structure.

Module Parameters: Access to a materials work centre complete with basic hand tools.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• identify and describe the main systems found in a residential structure	• an oral or written presentation that identifies and describes the four major systems found in a residential structure. *Assessment Tool* *Presentations/Reports: Building Systems, CON1070–1* *Standard* *Presentation will identify and describe the purpose and major components of the structural, electrical, heating and plumbing systems* *Performance rating of 1 for each applicable task*	20
• list and describe the basic materials and hand tools used in building construction	• the accurate identification and description of four different building materials and 10 hand tools used in building construction. *Assessment Tool* *Presentations/Reports: Building Systems, CON1070–1* *Standard* *Performance rating of 1 in each applicable task*	20

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MODULE CON1070: BUILDING CONSTRUCTION (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• apply basic construction techniques to build a simple scale model or full-size structure/system	• demonstration of safe construction skills in the building of a simple model or full-size building structure/system. *Assessment Tool* *Assessment Framework: Activity Assessment, CONACT* *Standard* *Full size structure or model is built according to accepted practice and meets overall specifications outlined on the working drawing* *Performance rating of 1 for each applicable task*	55
• profile a trade or occupation within the building construction industry	• presentation that outlines one or more trades or occupations and range of career opportunities within the building construction industry; e.g.: – carpenter – cabinetmaker – plumber – electrician. *Assessment Tool* *Research Process: Career Opportunities in Building Construction, CON1070–2* *Standard* *Performance rating of 1 for each applicable task*	5
• demonstrate basic competencies.	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

MODULE CON1070: BUILDING CONSTRUCTION (continued)

Concept	Specific Learner Expectations	Notes
Orientation	*The student should:*	
• Nature of Construction	• list and describe the major types of construction projects; e.g.: – residential – industrial – commercial – civil	Students should understand that a construction project can be something other than a building.
	• describe how information is gathered and used in the construction industry	Refer to the clients' needs, site information engineering specifications and building codes.
	• list and describe the systems that are found in most buildings; e.g.: – structural – electrical – heating, ventilating and air conditioning – water and waste removal	
• Project Design and Construction	• describe the methods that are used to communicate ideas and information relative to design and construction of a project	Have students gain experiences reading simple architectural drawings.
	• identify the factors that affect the design of a structure such as safety, function and aesthetics	
	• identify design techniques that are used to counteract static and dynamic forces on a structure	Investigate the use of braces, trusses and ties commonly used in construction.
• Health and Safety	• describe how structural materials and construction tools are safely used on the work site.	Have students become aware of the role of OH&S in relation to workers.
Planning and Management		
• Design	• select or modify a set of working drawings to build a simple building structure or system	The structure can be full size or built to scale.
	• select or identify an appropriate location	

MODULE CON1070: BUILDING CONSTRUCTION (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
• Material Selection	• identify the materials that can be used to construct the: – foundation or support system – floor and wall system – roof system – exterior/interior finishes • describe the landscaping features that will be used to complete the project.	All terminology used in this module should be consistent with the *Canadian Wood-Frame House Construction* glossary of terms.
Implementation		
• Building Processing	• use the appropriate tools, materials and processes to: – construct a simple shelter, scale model or system	
• Personal Safety	• use the appropriate personal protective clothing and equipment.	
Assessment		
• Career Information	• identify and describe skilled, technical and professional occupations that are related to the building construction industry • identify and assess personal interests and abilities related to making realistic career choices	
• Career Preparation	• maintain a record of completed activities within a portfolio.	

MODULE CON1120: PROJECT MANAGEMENT

Level: Introductory

Theme: Manufacturing Systems (Processes and Applications)

Prerequisite: CON1010 Basic Tools & Materials

Module Description: Students develop basic shop drawing and estimating skills, and apply them to build a product.

Module Parameters: Access to a materials work centre, complete with basic drawing and construction tools, and to instruction from an individual with specialized training in the use of power tools.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• identify and describe the parts of a technological system	• visual presentation of a technological system that includes: – identification of the components of a technological system such as input, process, output, feedback – description of each component – explanation of the difference between an open and closed system. *Assessment Tool* *Presentations/Reports: Technological System, CON1120–1* *Illustrative Example: Technology System, CON1120–2* *Standard* *Performance rating of 1 for each applicable task*	10
• apply basic drawing skills to prepare a shop drawing	• demonstration of basic drawing skills to produce a shop drawing of a simple product with two or more parts. *Assessment Tool* *Project Assessment: Project Development and Presentation, CON1120–3* *Standard* *Views are to be appropriately identified, laid out and measurements are within the accepted tolerance of ± 1 mm. Quality of lining, dimensioning and lettering meet accepted practice* *Performance rating of 1 for each applicable task*	25

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MODULE CON1120: PROJECT MANAGEMENT (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• prepare a project timeline, cost estimate and work schedule	• completion of a bill of materials, time and cost estimate and event sequence for a simple multiple part project. *Assessment Tool* *Project Assessment: Project Development and Presentation, CON1120–3* *Standard* *Bill of materials includes proper material and size description; accurate quantities of materials and costs. Major events are identified, time estimated and sequenced in a safe and logical manner* *Performance rating of 1 for each applicable task*	15
• apply the use of a technological system to construct a simple product with multiple parts	• demonstration of basic production skills to safely construct a product with multiple parts or components. *Assessment Tool* *Project Assessment: Project Development and Presentation, CON1120–3* *Illustrative Example: Technology System, CON1120–2* *Standard* *The product is constructed according to the prepared drawing, event sequence, cost and time estimates* *Performance rating of 1 for each applicable task*	50
• demonstrate basic competencies.	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
Orientation	*The student should:*	
• Technological System	• describe the components of a technological system; e.g.: – input – output – process – feedback	Use activities related to the planning and development of a simple product to show how the parts of a technologies system work together.
• Drawing Types	• list and describe common types of shop drawings • identify manual techniques and/or computer processes to create a drawing	Have the students work primarily with orthographic, oblique and isometric drawings.
• Product Design	• identify a variety of products and describe the types of materials, joints, fastening and finishing systems that are used and explain how these details are shown on a drawing	Have students identify the types of fasteners and adhesives that are used in conjunction with butt, dado, rabbet and miter joints to produce a product.
• Estimating	• identify the method of costing materials using lineal, area and volume measurements • describe methods that are used to estimate the amount of time required to complete a project.	Point out the importance of being able to measure and calculate accurately in time and cost estimates and quality of the product.
Planning and Management	• create or modify a suitable product design • prepare a working drawing of a product with multiple parts • analyze the drawing to create a: – material list – cost estimate – work schedule.	Project choices might include: • toy • furniture accessory • kitchen accessory.

MODULE CON1120: PROJECT MANAGEMENT (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Implementation		
• Material Processing	• for a product with multiple parts, use the appropriate tools, materials and processes to: – lay out, cut, surface and size materials – assemble and fasten parts – prepare for finishing – apply a simple finish	Review tool and equipment safety as well as the safe use of hazardous materials.
• Health and Safety	• matches the manufacturer's recommendations and WHMIS regulations when using hazardous finishing materials • use personal protective equipment.	Ensure containers are labelled and adequate ventilation is provided.
Assessment		
• Quality Control	• identify methods to improve quality and productivity; e.g.: – accurate measurements – choice of correct tools – use of tools that are in good condition	
• Career Preparation	• maintain a record of completed activities within a portfolio.	Students should be encouraged to make reflective notes and keep a record of work completed.

MODULE CON1130: SOLID STOCK CONSTRUCTION

Level: Introductory

Theme: Manufacturing Systems (Processes and Applications)

Prerequisite: CON1010 Basic Tools & Materials

Module Description: Students develop basic hand and power tool skills to build a product made from solid wood.

Module Parameters: Access to a materials work centre complete with basic hand and power tools, and to instruction from an individual with specialized training in the use of power tools.

Supporting Module: CON1120 Project Management

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• identify and describe the physical characteristics of a variety of hard and soft woods	• the accurate identification and description of four solid woods used to construct wooden products. *Assessment Tool* *Response Assessment: Wood Characteristics, CON1130–1* *Standard* *Response rating of 1*	15
• apply basic drawing and transfer skills to prepare a pattern or template	• application of the principles of proportion and transfer skills to produce a pattern or template from a scale drawing. *Standard* *The template is to be within ± 1 mm of the original plan or object* *Performance rating of 1 for each applicable task*	15
• construct a wooden product, using basic joinery techniques	• demonstration of basic joinery skills to safely construct a product from solid stock. *Assessment Tool* *Project Assessment: Building with Solid Stock, CON1130–2* *Illustrative Example: Cutting Board, CON1130-3* *Standard* *The product should be constructed according to the prepared template, working drawing and event sequence. Joints are to be tight fitting, surfaces should be free of marks, gouges, burns and voids* *Performance rating of 1 for each applicable task*	70

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MODULE CON1130: SOLID STOCK CONSTRUCTION (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • demonstrate basic competencies.	*Assessment of student achievement should be based on:* • observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation		
• Solid Stock	• describe the physical characteristics of a variety of hard and soft woods • list and describe common wood faults • identify and describe correct methods of handling and storing lumber	
• Built-up Stock	• describe common methods of making a built-up surface using edge joints and reinforce with dowels, biscuits or splines • describe the process of squaring solid stock	Point out the importance of storing materials correctly. Stress the importance of squaring stock in the proper sequence.
• Tool Safety	• describe the safe operation of hand and power equipment that are used to: – joint and surface solid stock – cut and shape irregular surfaces – scrape and sand flat and irregular surfaces.	Introduce students to the appropriate hand and power tools.

MODULE CON1130: SOLID STOCK CONSTRUCTION (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Planning and Management		
• Product Design	• identify common shapes and lines used in product design • select or modify a plan for a free-standing or wall-mounted product that is made from solid or built-up stock • produces a pattern or template from a scale drawing • develop a cutting list and event sequence.	Explain how straight, circular and curved lines can be used to form pleasing shapes. Projects to consider might include a wall or corner shelf, bench, cutting board or turned product.
Implementation		
• Material Processing	• use the appropriate tools, materials and processes to: – cut and surface stock – joint, glue and clamp – measure and lay out parts – cut and shape parts – assemble and fasten – prepare for finishing – apply a finish.	It is important that students receive safety instruction prior to the use of hand and power tools.
Assessment		
• Quality control	• complete a visual inspection of the product to see that the joints are tight fitting, and surfaces are free of marks, gouges, burns and voids	
• Career Preparation	• maintain a record of completed activities within a portfolio.	

MODULE CON1140: TURNING OPERATIONS

Level:	Introductory
Theme:	Manufacturing Systems (Processes and Applications)
Prerequisite:	CON1130 Solid Stock Construction
Module Description:	Students use wood-turning equipment and techniques to create a faceplate and spindle turning made from solid and/or built-up stock.
Module Parameters:	Access to a materials work centre, complete with basic hand and power tools, and to instruction from an individual with specialized training in the use of power tools.
Supporting Module:	CON1120 Project Management

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• operate, safely, a power wood lathe	• demonstration of the safe set-up, use and shut-down procedures. *Assessment Tool* *Equipment Checklist: Wood Lathe, CONEQUIP-3* *Standard* *All procedures are performed according to standard lathe practice and specific recommendations of the lathe manufacturer*	15
• apply drawing and transfer skills to prepare a full-size pattern or template	• preparation of a full-size pattern or template. *Standard* *The pattern and/or template is to be within ± 1 mm of the original plan or object* *Performance rating of 2 for each applicable task*	15
• produce a faceplate and spindle turning, using solid or built-up stock	• demonstration of accepted material preparation and wood-turning skills. *Assessment Tool* *Assessment Framework: Project Assessment, CONPRO* *Standard* *The turnings should be within ± 2 mm of the original drawing or free formed according to accepted design principles. The product should be free of major production defects (machining marks, gouges, burns and voids)* *Performance rating of 2 for each applicable task*	70

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MODULE CON1140: TURNING OPERATIONS (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: - demonstrate basic competencies.	*Assessment of student achievement should be based on:* - observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
Orientation - Health and Safety	*The student should:* - identify and demonstrate the safe use and operation of the wood lathe	Discuss the need for properly maintained tools, dust control equipment and the use of personal protective equipment.
- Materials	- identify the common lathe chisels and accessories associated with wood turning - describe recommended tools and accessories for faceplate and spindle turning - identify and describe accepted work piece mounting and supporting techniques - describe the turning characteristics of a number of common woods - identify finishes and finishing procedures suitable for common turned products.	
Planning and Management - Product Design	- select, modify or design a faceplate and/or spindle-type product that incorporates three or more different types of cuts - create a full-size pattern or template	It is recommended that students complete CONEQUIP-3: Wood Lathe Equipment Checklist prior to the use of this piece of equipment.

Concept	Specific Learner Expectations	Notes
	The student should:	
• Estimating	• prepare a material list and cost estimate	
• Event Sequencing	• show a sequence of operations that facilitates the safe and efficient use of materials, tools and equipment • calculate the appropriate turning speeds using tables.	Demonstrate proper procedures and sequence of events to produce: – straight and taper cuts – coves and Vs – beads and shoulders – concave and convex surface.
Implementation		
• Lathe Work	• demonstrate the appropriate skills to: – prepare stock for turning – lay out and size a rough turning – rough cut and finish cut according to a predetermined pattern/template or free forming principles – sand and apply the recommended finish – remove and assemble finished product.	Discuss free forming principles used by artisans and the use of copy lathes and automated equipment used in industry.
Assessment		
• Quality Control	• complete a visual inspection of a product to determine whether the structure is sound, surfaces are free of scratches, gouges, burns and voids • demonstrate efficient methods to improve quality and productivity	
• Career Preparation	• maintain a record of completed activities within a portfolio.	

MODULE CON1160: MANUFACTURED MATERIALS

Level: Introductory

Theme: Manufacturing Systems (Processes and Applications)

Prerequisite: CON1010 Basic Tools & Materials

Module Description: Students select and use the appropriate materials and tools to build a product or structure from a wood composite or other manufactured material.

Module Parameters: Access to a materials work centre, complete with basic hand and power tools, and to instruction from an individual with specialized training in the use of power tools.

Supporting Module: CON1120 Project Management

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• identify and describe the characteristics of common manufactured materials	• identification and description of a variety of common manufactured sheet materials. *Assessment Tool* *Response Assessment: Characteristics of Manufactured Materials, CON1160–1* *Standard* *The accurate identification and description of four different manufactured sheet products* *Response rating of 1*	15
• demonstrate the safe use of a given hand and power tool	• safe set-up, use and shut-down procedures related to the safe use of one or more stationary/portable power tools. *Assessment Tool* *Use the appropriate power tools performance check list such as:* *Equipment Checklist: Drill Press, CONEQUIP–1* *Equipment Checklist: Bandsaw, CONEQUIP–2* *Standard* *All procedures of operation are performed according to standard practice and specific recommendations of the equipment manufacturer*	15

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MODULE CON1160: MANUFACTURED MATERIALS (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• create a product from a manufactured material, using basic joinery techniques	• demonstration of basic joinery skills and processes to construct a product from manufactured materials. *Assessment Tool* *Project Assessment: Building with Manufactured Materials, CON1160–2* *Illustrative Example: Portable Work Bench, CON1160–3* *Standard* *The product should be constructed according to the working drawing and event sequence. Joints are to be tight fitting; surface should be free of marks, and edges treated appropriately* *Performance rating of 1 for each applicable task*	70
• demonstrate basic competencies.	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation		
• Materials	• identify the various types of manufactured materials; e.g.: – plywood – hardboard – particle board • describe how a common manufactured material is made • explain the advantages of using manufactured materials	Because of the many types of manufactured materials available, students need to understand how they are best used.

Concept	Specific Learner Expectations	Notes
	The student should:	
• Construction Processes	• describe typical methods of constructing a product from a manufactured material; e.g.: – types of joints – fastening systems – edge treatments • identify the factors that determine the quality of a wood joint	Discuss how the type of joint affects the overall strength, usefulness and appearance of a product. Note the advantages of using KD (knock down) joints and hardware used in many of today's products.
• Tool Safety	• describe the safe operation of hand and power tools to make dado, rabbet and miter joints in plywood and other manufactured materials	
• Finishing	• identify and describe common methods used to finish plywood and other wood substitutes.	
Planning and Management	• select or modify a plan for a project that incorporates basic joinery and edge treatment techniques • create a bill of materials, cutting list and event sequence.	Have students consider a project such as a: • tool box • portable work bench • shelving unit • speaker enclosure • storage unit.
Implementation		
• Material Processing	• use the appropriate tools, materials and processes to: – measure and lay out the components – cut to size and surface all edges – edge bond all exposed surfaces as required – machine the appropriate joints – assemble and clamp – attach the appropriate hardware – prepare for finishing – apply a suitable finish.	Discuss the importance of sizing all parts before laying out and cutting the joints.

MODULE CON1160: MANUFACTURED MATERIALS (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Assessment		
- Quality Control	- conduct a visual inspection of components to see that the joints are tight fitting, surfaces are free of marks, edges are covered and finished appropriately	
- Career Preparation	- maintain a record of completed activities within a portfolio.	

MODULE CON1180: MOLD MAKING & CASTING

Level: Introductory

Theme: Manufacturing Systems (Processes and Applications)

Prerequisite: CON1010 Basic Tools & Materials

Module Description: Students apply knowledge of casting and molding materials and processes to prepare a mold and produce a casting.

Module Parameters: Access to a materials work centre complete with molding and casting equipment.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• list and describe common materials and processes used in casting/molding	• identification and description of common casting/molding materials and processes. *Assessment Tool* *Response Assessment: Characteristics of Casting/Molding Materials, CON1180–1* *Standard* *The accurate identification and description of three different casting materials such as clay slip, concrete and plastic* *Response rating of 1*	10
• apply principles of pattern making to create a simple mold	• demonstration of pattern and mold-making skills to produce a simple pattern and mold. *Assessment Tool* *Assessment Framework: Project Assessment, CONPRO* *Standard* *Patterns or molds are made from the appropriate materials and allows for convenient pouring and extraction of the final product* *Performance rating of 1 for each applicable task*	45

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Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• cast and finish a product, using the appropriate skills, materials and processes	• demonstration of casting or molding skills to produce a simple molding or casting. *Assessment Tool* *Assessment Framework: Project Assessment, CONPRO* *Standard* *Casting/moldings should be free of voids; meet the stated specifications related to size, shape and quality of finish* *Performance rating of 1 for each applicable task*	45
• demonstrate basic competencies.	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation		
• Casting and Molding	• identify and describe materials used to cast/mold such as: – clay slip – concrete – polystyrene beads – plastisol – model metal	
	• describe common processes of casting/molding clay, concrete and plastic	Investigate process related to: • slip casting • pre-cast concrete • injection molding • rotational molding • dip molding.
	• differentiate between hardening by cooling, curing and drying	

MODULE CON1180: MOLD MAKING &CASTING (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
• Health and Safety	• identify and describe the health and safety hazards associated with heating plastic and firing ceramic products	Ensure that there is adequate ventilation when heating plastic and firing ceramic materials.
• Pattern and Mold Making	• describe the kinds of materials and methods that are used to make patterns and molds.	Discuss ethical issues related to copying existing products.
Planning and Management		
• Mold Design	• design or prepare a mold for a ceramic or plastic product • calculate the quantities of materials required to make a casting	Students will need to consider ways to secure the mold, pour and extract the product.
• Casting and Molding	• prepare a detailed step-by-step set of procedures to make a cast or molded product • locate the necessary personal protective clothing and equipment for a specific casting/molding process • describe a plan of action in the event of an accident.	
Implementation		
• Material Processing	• use the appropriate tools, materials and processes to: – make or prepare a mold – measure and mix quantities of materials – pour, cure and finish a cast and/or molded product	
• Health and Safety	• use the appropriate personal protective equipment.	

Concept	Specific Learner Expectations	Notes
	The student should:	
Assessment		
• Quality Control	• describe factors that affect the quality of a cast or molded product	Have students note that there is a very close relationship between the quality of a mold and the quality of the finished product.
• Career Information	• list potential career opportunities related to casting and molding	
• Career Preparation	• maintain a record of completed activities within a portfolio.	

MODULE CURRICULUM AND ASSESSMENT STANDARDS:
SECTION E: INTERMEDIATE LEVEL

The following pages define the curriculum and assessment standards for the intermediate level of Construction Technologies.

Intermediate level modules help students build on the competencies developed at the introductory level and focus on developing more complex competencies. They provide a broader perspective, helping students recognize the wide range of related career opportunities available within the strand.

Module CON2010: Site Preparation E.3
Module CON2020: Concrete Forming E.7
Module CON2030: Alternate Foundations E.11
Module CON2040: Framing Systems 1 (Floor & Wall) E.15
Module CON2050: Roof Structures 1 (Framing & Finishing) E.19
Module CON2060: Exterior Finishing (Door, Window & Siding) E.23
Module CON2070: Electrical Systems E.27
Module CON2080: Plumbing Systems E.31
Module CON2090: Climate Control Systems E.35
Module CON2100: Agri-structures E.39
Module CON2120: Multiple Materials E.43
Module CON2130: Furniture Making 1 (Box Construction) E.47
Module CON2140: Furniture Making 2 (Frame & Panel) E.51
Module CON2150: Finishing & Refinishing E.55
Module CON2160: Cabinetmaking 1 (Web & Face Frame) E.59
Module CON2170: Cabinetmaking 2 (Door & Drawer) E.63
Module CON2180: Wood Forming E.67
Module CON2190: Manufacturing Systems E.71
Module CON2200: Product Development E.75

MODULE CON2010: SITE PREPARATION

Level: Intermediate

Theme: Building Systems (Processes and Applications)

Prerequisite: CON1070 Building Construction

Module Description: Students develop the knowledge and skills to acquire a building permit and to locate and prepare a site for excavation and foundation work.

Module Parameters: Access to a building site and/or construction facility and to instruction from an individual with specialized training in carpentry.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• identify and describe typical building site layout and excavation processes	• presentation of an independently researched report that includes: – identification and use of batterboards, building lines, plumb bob, builder's level and transit – use of the 3, 4, 5 principle (Pythagorean Theorem) – description of excavation methods and equipment – safety precautions with an emphasis on shoring. *Assessment Tool* *Research Process: Preparing a Building Site, CON2010–1* *Standard* *Performance rating of 2 for each applicable task*	15
• complete an application for a building permit	• completion of a building permit using a recognized form that includes all information required to meet local building standards	15
• apply site preparation skills to assist in the location of building site lines and features	• demonstration of site preparation and teamwork skills to: – establish building lines using batterboards and plumb bobs – lay out building features using a builder's level or transit and the 3, 4, 5 squaring method. *Assessment Tool* *Activity Assessment: Building Site Layout, CON2010–2* *Standard* *Specific dimensions are within ± 3 mm over 6 metres* *Performance rating of 2 for each applicable task*	70

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • demonstrate basic competencies.	*Assessment of student achievement should be based on:* • observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation		
• Building Regulations	• explain the purpose of local, provincial and national building regulations • identify local zoning regulations that limit the type, size and location of new buildings	Point out that in addition to structural regulations, building codes also deal with fire and health issues.
• Site Selection	• identify the parameters for selecting a building site	
• Site Layout	• describe a typical method of establishing lot and building lines as well as grade levels	Students should be able to use the 3–4–5 rule, builder's level, transit and batterboards.
• Lay Out Tools	• explain the use of a plumb bob, builder's level, transit and string line.	Discuss other methods of leveling such as hydro and laser levelling techniques.
Planning and Management		
• Estimating	• identify the information that is needed to complete an application for a building permit • use site plan and elevation drawings to determine the amount of soil to be excavated	
• Worker Safety	• locate and mark all underground and overhead services • identify soil conditions that may require shoring.	Discuss the importance of having the utility companies mark the location of all underground services.

MODULE CON2010: SITE PREPARATION (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Implementation		
• Building Layout	• use an approved method to: – position batterboards – locate lot and building lines – excavate – establish locations and elevations for wall and pier footings.	This work can be simulated if a construction site is not available. In this case, a tour of a construction site will enhance this module.
Assessment		
• Career Information	• identify career opportunities related to the work of a/an: – developer – urban planner – surveyor – excavator	
• Career Preparation	• maintain a record of completed activities within a portfolio.	

MODULE CON2020: CONCRETE FORMING

Level: Intermediate

Theme: Building Systems (Processes and Applications)

Prerequisite: CON1070 Building Construction

Module Description: Students develop knowledge and skills related to the preparation and construction of a concrete foundation.

Module Parameters: Access to a building site and/or construction facility and to instruction from an individual with specialized training in carpentry.

Supporting Module: CON2010 Site Preparation

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• list and describe factors that affect footing and wall design • identify and describe common forming materials and processes	• a written or oral response that correctly identifies factors that affect footing and wall design, types of forms, form materials, ties and release agents. *Assessment Tool* *Response Assessment: Concrete Forming, CON2020–1* *Standard* *Terminology should be consistent with that used in* Canadian Wood-Frame House Construction *Response rating of 2*	25
• apply concrete forming skills to assist in forming and placing a concrete foundation	• the completion of a project that incorporates full-size formwork or development of a scale model. *Assessment Tool* *Activity Assessment: Concrete Forming and Placing, CON2020–2* *Standard* *Installation of forms is consistent with accepted trade practice. Components are assembled to meet overall specifications to a tolerance of ± 3 mm over 6 metres. Forms are reinforced to maintain their position during placement. The concrete is consolidated to prevent honeycombing and is finished appropriate to the floor system. The concrete is allowed to cure properly before stripping in a manner the preserves the integrity of the footing and wall section* *Performance rating of 2 for each applicable task*	75

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • demonstrate basic competencies.	*Assessment of student achievement should be based on:* • observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation		
• Soil Condition	• describe how soils are tested for: – resistance to penetration – shear resistance – moisture content	Discuss the load-bearing strengths of different soil types and explain how the strengths affect the footing design.
	• explain how soil, water and frost conditions affect the design and construction of a foundation as well as excavation and safety procedures	
• Footing and Wall Forming	• explain the purpose of a footing	Explain why footings must be monoliths and be located below the frost line whenever possible.
	• describe one or more common techniques to form footings, walls and piers	Investigate the use of built-in-place and prefabricated forming systems.
	• describe methods of reinforcing a footing and wall section	
	• identify the parts of a typical concrete wall form • explain the difference between box-sill and cast-in-place construction	Examine methods used to create corner assemblies and to secure the kickplate.
	• identify release agents and coatings used on forms	

Concept	Specific Learner Expectations	Notes
	The student should:	
• Concrete Mixer	• describe types of cement and concrete mixers used in footing and wall systems.	
Planning and Management		
• Print Reading	• describe factors that determine the size and strength of a footing and wall components • prepare a detailed list of materials and supplies to form a footing and wall	
• Estimating	• calculate the volume of concrete required for a footing and wall component.	
Implementation		
• Form Work, Concrete Placement and Finishing	• use the appropriate tools and materials to: – construct a set of forms for a rectangular footing and wall section – square level, align and brace – place, consolidate and finish a concrete footing and wall section – make provisions to attach a sill plate if necessary – seal walls below ground level and install weeping tile – back file taking account lateral pressure.	Note the importance of wearing personal protective equipment while on the work site.
Assessment		
• Career Information	• identify opportunities for training and business ventures related to concrete forming, placing and finishing	Discuss alternative methods of building a concrete foundation using unit masonry, precast and polystyrene blocks.
• Career Preparation	• maintain a record of completed activities within a portfolio.	

MODULE CON2030: ALTERNATE FOUNDATIONS

Level: Intermediate

Theme: Building Systems (Processes and Applications)

Prerequisite: CON1070 Building Construction

Module Description: Students develop basic knowledge and skills related to the design and construction of an alternative foundation system.

Module Parameters: Access to a building site and/or construction facility and to instruction from an individual with specialized training in carpentry.

Supporting Module: CON2020 Concrete Forming

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• identify and describe the components of an alternative foundation system	• a written or oral presentation that correctly identifies the materials and design features of one or more alternate foundations systems *and*	25
• identify the health hazards and precautions related to the use of engineered materials	• knowledge of product labels for safe use and disposal of alternate foundations materials. *Assessment Tool* *Presentations/Reports: Wood Foundations, CON2030–1* *Standard* *Performance rating of 2 for each applicable task*	
• apply construction skills to assist in the design/construction of an alternative foundation system	• observation of the construction and placement of an alternate foundation or display model. *Assessment Tool* *Activity Assessment: Wood Foundation Framing, CON2030–2* *Standard* *Foundation/display model is built according to local code requirements, components are assembled and appropriately braced. Walls are moisture proofed and correctly back filled. Overall dimensions are within ± 3 mm over 6 meters* *Performance rating of 2 for each applicable task*	75

MODULE CON2030: ALTERNATE FOUNDATIONS (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • demonstrate basic competencies.	*Assessment of student achievement should be based on:* • observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation		
• Alternate Systems and Materials	• describe alternate foundation systems and materials such as: – concrete masonry block – preserved wood – foam form	Discuss the advantages and disadvantages of using an alternate foundation system.
• Related Building Codes	• identify local building codes that pertain to the design and construction of alternate foundations systems	
• System Design	• label and describe the parts of a typical preserved wood, masonry block and/or foam form foundation	Explain why walls should be designed to take advantage of block/ sheet sizes.
	• list and describe the factors that determine the design and construction of a footing and wall section for one or more alternate systems	
	• describe levelling and plumbing techniques that are used with a particular foundation system	Discuss typical methods to attach a sill plate to a given wall system.
	• describe recommended methods that are used to control drainage and damp-proof an alternate foundation system	
	• describe the flooring options that can be used with an alternate foundation system.	

MODULE CON2030: ALTERNATE FOUNDATIONS (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Planning and Management		
• Structural Design	• prepare a sketch of an alternate foundation that identifies construction details, size and spacing of component, as well as sealing, drainage and damp-proofing features	Review the safe use of power tools common to construction activities.
• Health and Safety	• identify suitable personal protective equipment and recommended procedures related to the use of alternate materials	Refer to product labels and material safety data sheets for appropriate directions when using wood preservatives. Students should avoid prolonged inhalation of dust. Wood preservatives should not be allowed to come in contact with skin or food.
	• describe suitable methods used to dispose of scrap materials.	Treated wood and foam scraps should not be burned in open fires or fireplaces.
Implementation	• use the appropriate tools, materials and processes to: – level the footings and create the necessary drainage system – lay out and assemble the wall section – seal joints and apply a vapour seal/ damp-proofing – backfill without damaging the moisture barrier.	Discuss the safe use of liquid preservatives.
Assessment		
• Career Information	• identify opportunities for entrepreneurial ventures and further training associated with alternate foundation systems	
• Career Preparation	• maintain a record of completed activities within a portfolio.	

MODULE CON2040: FRAMING SYSTEMS 1 (FLOOR & WALL)

Level:	Intermediate
Theme:	Building Systems (Processes and Applications)
Prerequisite:	CON1070 Building Construction
Module Description:	Students develop basic framing knowledge and skills associated with the construction of a floor and wall system.
Module Parameters:	Access to a building site and/or construction facility and to instruction from an individual with specialized training in carpentry.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• identify and describe the parts of a floor and wall framing system	• a written or oral response that correctly identifies and describes: – floor and wall framing components – framing techniques. *Assessment Tool* *Response Assessment: Floor and Wall Framing, CON2040–1* *Standard* *Response rating of 2*	20
• read and interpret the appropriate drawings and specifications to create a floor and wall framing and sheathing estimate	• a detailed list and cost of materials taken from a given working drawing of a floor and wall component. *Assessment Tool* *Activity Assessment: Floor and Wall Framing, CON2040–2* *Standard* *Estimate includes allowances for floor and wall openings, over-run and waste considerations* *Performance rating of 2 for each applicable task*	20

MODULE CON2040: FRAMING SYSTEMS 1 (FLOOR & WALL) (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• apply framing skills to assist in the layout and construction of floor and wall components	• the observation of framing skills through on-site, in-shop or mock-up work. *Assessment Tool* *Activity Assessment: Floor and Wall Framing, CON2040–2* *Standard* *The floor and wall components are framed according to conventional building practices and specified dimensions are within ± 3 mm over 6 metres* *Performance rating of 2 for each applicable task*	60
• demonstrate basic competencies.	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation		
• Materials	• describe common wood defects associated with natural growth and milling operations • compare the span limitations of different species and grades of lumber and manufactured components • identify common types of sheathing and subflooring materials	If a framing project requires more than 25 hours, or is more advanced, add a project module from Career Transitions or combine with CON3210: Framing Systems 2 (Floor, Wall & Ceiling)
• Fasteners	• identify the adhesives and fasteners used in conjunction with floor and wall framing	

MODULE CON2040: FRAMING SYSTEMS 1 (FLOOR & WALL) (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
• Floor and Wall Structures	• identify the parts and purpose of a typical wall and floor framing system • compare platform framing to post and beam construction • describe the consequences of a floor system that has not been sized or constructed properly • identify and describe the proper use of portable electric and air activated tools.	Discuss the relationship of the floor and wall design to the overall strength and stability of a building.
Planning and Management		
• Floor and Wall Design	• use a frame structure drawing to determine the location, type and sizes of joists, beams, sills and headers as well as subflooring requirements • use a wall frame elevation to determine the size and locations of studs, headers and rough size openings	
• Estimating	• prepare a quantity survey for a floor and wall section.	
Implementation		
• Health and Safety	• demonstrate proper methods of lifting materials and components • use proper personal protective equipment • cover openings and build railings where needed	Emphasize the importance of safety on the work site.
• Tools and Processes	• use the appropriate hand tools and portable equipment to: – lay out components – cut and assemble floor joists and wall sections – square floor and wall components – install subflooring and sheathing – lay out and assemble a wall section – erect, plumb and brace wall sections.	Review the safe use of air and electrically operated tools.

MODULE CON2040: FRAMING SYSTEMS 1 (FLOOR & WALL) (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Assessment • Career Information • Career Preparation	• identify the trade qualifications and employment opportunities related to residential framing • maintain a record of completed activities within a portfolio.	

MODULE CON2050: ROOF STRUCTURES 1 (FRAMING & FINISHING)

Level: Intermediate

Theme: Building Systems (Processes and Applications)

Prerequisite: CON1070 Building Construction

Module Description: Students develop basic knowledge and skills associated with framing and finishing a simple roof system.

Module Parameters: Access to a building site and/or construction facility and to instruction from an individual with specialized training in carpentry.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• identify and describe the different styles and parts of a roof system	• a written or oral response that correctly identifies and describes basic roof styles and roofing components. *Assessment Tool* *Response Assessment: Roof Construction, CON2050–1* *Standard* *Response rating of 2*	10
• read and interpret the appropriate drawings and specifications to create a roof framing and finishing estimate	• description and quantities of materials required to frame, sheath and apply a finished covering on a typical roof. *Assessment Tool* *Activity Assessment: Roof Construction, CON2050–2* *Standard* *Estimate includes all allowances for roof openings, over-run and waste requirements* *Performance rating of 2 for each applicable task*	20

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MODULE CON2050: ROOF STRUCTURES 1 (FRAMING & FINISHING) (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• apply roofing skills to assist in the framing and finishing of a roof structure	• demonstration of framing and finishing skills. *Assessment Tool* *Activity Assessment: Roof Construction, CON2050–2* *Standard* *The roof is framed and covered according to conventional building practice. Specified dimensions are within ± 3 mm over 6 metres* *Performance rating of 2 for each applicable task*	70
• demonstrate basic competencies.	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation		
• Roof Structures	• list and describe the common styles of roofs • define roof terms such as span, run, rise, slope and overhang • describe the parts of a common rafter • describe the parts of a typical roof truss • describe the advantages of using roof trusses versus standard common rafters	Focus mainly on simple roof structures and coverings in this module. Intersecting roof structures are covered in CON3050: Roof Structures 2 (Framing & Covering). Discuss issues related to the installation of air/vapour barriers and insulation.
	• list and describe the parts of a boxed cornice • identify sheathing grades and types; joint and nailing patterns • list and describe the types of roof finishes.	Refer to building codes for proper sheathing grades, nail sizes and spacing.

MODULE CON2050: ROOF STRUCTURES 1 (FRAMING & FINISHING) (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Planning and Management		
• Roof Design	• make a roof sketch indicating the location of roof trusses, look-out rafters, bridging, fascia headers, boxed cornices and sheathing patterns	
• Estimating	• prepare a material list specifying: – the size, slope and number of roof trusses or common rafters – thickness and quantities of sheathing – quantities of H-clips and metal anchors – style, colour, weight and quantities of asphalt shingles.	
Implementation		
• Health and Safety	• check condition of ladders before using and observe safe angle ratios • use proper foot and head protection • identify hazards associated with wet or frosty conditions on sloped surfaces • identify safety devices that are used in conjunction with roof construction	Discuss methods of temporarily and permanently bracing roof trusses.
• Tools and Processes	• use the appropriate tools and equipment to: – locate, fasten, square and plumb roof trusses – cut and install common rafters • install look-outs, fascia and braces • apply sheathing and shingling.	Demonstrate appropriate methods to lay the ridge cap to minimize wind damage.
Assessment		
• Career Information	• outline the trade qualifications and employment opportunities related to residential framing and roofing	
• Career Preparation	• maintain a record of activities within a portfolio.	

MODULE CON2060: EXTERIOR FINISHING (DOOR, WINDOW & SIDING)

Level: Intermediate

Theme: Building Systems (Processes and Applications)

Prerequisite: CON1070 Building Construction

Module Description: Students apply and develop basic knowledge of door, window and siding systems and installation skills and procedures.

Module Parameters: Access to a building site and/or construction facility and to instruction from an individual with specialized training in carpentry.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• identify and describe common types of exterior doors, windows and siding materials	• a written or oral presentation that correctly identifies at least three different exterior doors, exterior window types and siding materials. *Assessment Tool* *Presentations/Reports: Window/Door and Siding Materials, CON2060–1* *Standard* *Performance rating of 2 for each applicable task*	10
• read and interpret the appropriate drawings and specifications to create a door and window schedule and siding estimate	• development of an accurate exterior door and window schedule and description of materials and quantities of siding required in a given set of plans. *Assessment Tool* *Assessment Framework: Activity Assessment, CONACT* *Standard* *Estimate includes all allowances for wall openings, over-run and waste requirements* *Performance rating of 2 for each applicable task*	20

MODULE CON2060: EXTERIOR FINISHING (DOOR, WINDOW & SIDING) (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• apply finishing skills to install a prehung door, a window unit and siding materials	• demonstration of door, window and siding systems skills. *Assessment Tool* *Assessment Framework: Activity Assessment, CONACT* *Standard* *Doors, windows and siding systems are installed in keeping with accepted trade practice and manufacturers' recommendations* *Performance rating of 2 for each applicable task*	70
• demonstrate basic competencies.	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation • Doors and Windows	• list and describe common types of exterior doors and windows • identify methods of sizing windows and exterior doors • describe the procedures used to install an exterior door and window	Explain the advantages and disadvantages of each style of door or window.
• Siding Components	• list and describe the components used in conjunction with the installation of vinyl and aluminum siding • describe the purpose and use of building papers and other house wrap materials.	Stress the importance of making provisions for the siding to expand and contract during heating and cooling.

MODULE CON2060: EXTERIOR FINISHING (DOOR, WINDOW & SIDING) (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Planning and Management • Ordering and Estimating	• use elevation drawings and specifications to develop a door and window schedule • use an elevation drawing to identify the types of siding and cornice materials and estimated amounts.	Discuss methods used to estimate siding materials.
Implementation • Windows and Doors • Exterior Finishes • Health and Safety	• use the appropriate tools and processes to: – level, plumb, seal and fasten a prefabricated door and window unit – install exterior finishes – check and secure all scaffolding – observe proper handling and lifting procedures – use appropriate eye and ear protection.	Refer to building code regulations.
Assessment • Career Information • Career Preparation	• identify employment and entrepreneurial opportunities associated with the supply and installation of windows, doors and exterior finishes • maintain a record of completed activities within a portfolio.	

MODULE CON2070: ELECTRICAL SYSTEMS

Level: Intermediate

Theme: Building Systems (Processes and Applications)

Prerequisite: CON1070 Building Construction

Module Description: Students apply electrical principles, and develop an understanding of residential electrical code requirements and installation procedures.

Module Parameters: Access to a building site and/or construction facility and to instruction from an individual with specialized training in electrical work.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• list and describe the electrical systems and components associated with residential wiring	• the presentation of a written or oral presentation that identifies and describes the electrical systems found in a typical residence. *Assessment Tool* *Presentation/Reports: Electrical Systems, CON2070–1* *Standard* *Performance rating of 2 for each applicable task*	10
• apply wiring principles and code requirements to create a wiring diagram	• the development of an electrical drawing of a typical room such as a bathroom, living room or bedroom. *Assessment Tool* *Activity Assessment: Branch Wiring, CON2070–2* *Standard* *The working drawing uses standard symbols showing the location and type of outlet, light or switch. Connections between switches and lights are shown along with the electrical service entry* *Performance rating of 2 for each applicable task*	20

MODULE CON2070: ELECTRICAL SYSTEMS (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• apply wiring skills to assist in the installation of a residential wiring system	• installation of an electrical system to include the required switches, lights and outlets found in a typical room. *Assessment Tool* *Activity Assessment: Branch Wiring, CON2070–2* *Standard* *Installation meets accepted trade practice and code requirements* *Performance rating of 2 for each applicable task*	60
• profile a trade or occupation within the electrical field	• presentation of an occupation profile that outlines: – present and future employment opportunities – training centres and entry requirements – description of occupation and working conditions. *Assessment Tool* *Research Process: Career Opportunities in Electrical Work: CON2070–3* *Standard* *Performance rating of 2 for each applicable task*	10
• demonstrate basic competencies.	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation		
• Health and Safety	• identify the principal hazards associated with electrical work such as shocks, burns, fire and falls • outline methods that are commonly used to prevent contact with a live electric circuit • identify the nonconducting extinguishing agents that can be used with electrical fires	Our familiarity with the use of electricity in our homes can cause us to forget that electricity can be lethal. Stress the importance of electrical safety.
• Electrical Principles	• describe and provide examples of: – alternating and direct current – series and parallel circuits • define the terms and explain the relationships between voltage, amperage and resistance in a typical circuit	
• House Wiring Design	• identify the common types of electrical systems found in a modern home such as lighting, utility, heating, communication and alarm systems • describe the symbols that are used to indicate a wall plug, light fixture, range, dryer plug, etc., on an electrical drawing • identify the code requirements for installing outlets in a kitchen, bathroom, living room and bedroom • list and describe the types of conductors and connection devices that are used in conventional construction • identify design and framing requirements when installing electrical fixtures and wires.	Note that the number of uses and demand for electricity in the home has increased significantly over the past decade.
Planning and Management		
• Wiring Project	• make a wiring diagram for a typical residential wiring project	
• Wiring Permit	• prepare a list of materials for a wiring project • complete an application for a wiring permit.	Obtain a local wiring permit application form.

MODULE CON2070: ELECTRICAL SYSTEMS (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Implementation		
• House Wiring	• use the appropriate tools, materials to frame and install a typical residential wiring circuit such as a: – general purpose and split receptacle – single-pole and three-way switch – ceiling fixture – outside outlet – service panel	Provide students with wiring frame or mock-up panels to complete tasks. Have students understand the purpose of a GFI circuit breaker and receptacle.
• Testing	• test a circuit for power, grounding and continuity.	
Assessment		
• Career Information	• identify the employment and business opportunities related to an electrical trade or occupation • identify personal interests and abilities related to making realistic career choices	
• Career Preparation	• maintain a record of completed activities within a portfolio.	

MODULE CON2080: PLUMBING SYSTEMS

Level: Intermediate

Theme: Building Systems (Processes and Applications)

Prerequisite: CON1070 Building Construction

Module Description: Students develop basic knowledge and skills to fabricate and make repairs to residential drainage, waste, vent (DWV) and water supply systems.

Module Parameters: Access to a building site and/or construction facility and to instruction from an individual with specialized training in plumbing.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• identify and describe the parts of a residential plumbing system	• a written or oral presentation that correctly identifies the: – components of a water supply system – drainage, waste and vent components – types of pipe and fittings used on each of these systems. *Assessment Tool* *Presentations/Reports: Common Plumbing Systems, CON2080–1* *Standard* *Performance rating of 2 for each applicable task*	10
• create a drawing of a water supply, drainage, waste and vent system for a typical plumbing fixture	• a plan for a water supply and DWV system for a household fixture in a bathroom or kitchen. *Assessment Tool* *Activity Assessment: Installing a Plumbing Fixture, CON2080–2* *Standard* *The plan is consistent with conventional plumbing practice and code requirements*	15

MODULE CON2080: PLUMBING SYSTEMS (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• **apply plumbing skills to assist in the installation of a water supply, waste and vent system**	• demonstrations of appropriate work skills related to installation of a plumbing fixture. *Assessment Tool* *Activity Assessment: Installing a Plumbing Fixture, CON2080–2* *Standard* *Installation practices should correspond to those accepted in the plumbing industry* *Performance rating of 2 for each applicable task*	65
• **profile a trade or occupation within the plumbing field**	• presentation of an occupation profile that outlines: – description of the occupation and working conditions – employment opportunities – training centres and entry requirements. *Assessment Tool* *Research Process: Career Opportunities in Plumbing, CON2080–3* *Standard* *Performance rating of 2 for each applicable task*	10
• **demonstrate basic competencies.**	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

MODULE CON2080: PLUMBING SYSTEMS (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation		
• Residential Plumbing Systems	• identify and describe the piping systems in a conventional residence such as water supply, vent, drainage and gas supply	
• Plumbing Design	• examine the principles related to proper sizing, venting, pressures and drainage angles • investigate and compare the use of iron, copper, brass and plastic components • identify the symbols that are used to depict common fixtures and fittings • identify the code requirements for installing a residential plumbing system	
• Installation Procedures	• identify appropriate methods of cutting, iron, copper, steel and plastic pipe • describe and demonstrate approved methods of joining pipe using solder, cohesives, mechanical joints and threaded fasteners • determine when to use face-to-face, centre-to-centre and shoulder-to-shoulder measurements.	
Planning and Management		
• Layout	• sketch a typical water supply and DWV system for a typical household fixture • use a plumbing layout drawing to create a detailed material list and cost estimate	Point out the need to comply with building code regulations.
• Health and Safety	• locate and use the appropriate fire extinguisher for a given type of fire • describe the health hazards associated with the use of solder and plastic adhesives.	

MODULE CON2080: PLUMBING SYSTEMS (continued)

Concept	Specific Learner Expectations	Notes
Implementation • Material and Tool Processes	*The student should:* • use the appropriate tools, materials and techniques to: – rough-in a water supply, DWV system – pressure-test a supply system – install a fixture and connect supply and drainage lines.	
Assessment • Career Information	• outline the trade qualifications and employment opportunities related to the plumbing trade • analyze personal interests and abilities related to making realistic career choices	
• Career Preparation	• maintain a record of completed activities within a portfolio.	

MODULE CON2090: CLIMATE CONTROL SYSTEMS

Level: Intermediate

Theme: Building Systems (Processes and Applications)

Prerequisite: CON1070 Building Construction

Module Description: Students investigate common heating, ventilating and air conditioning (HVAC) systems and principles, and participate in the installation or maintenance of one of these systems.

Module Parameters: Access to a building site and/or construction facility and to instruction from an individual with specialized training in sheet metal and climate control installation/service.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• list and describe the major components of a typical heating, ventilating and air conditioning system	• the accurate identification and description of the components given a representation of a typical residential HVAC system. *Assessment Tool* *Response Assessment: Heating, Ventilating and Cooling Systems, CON2090–1* *Standard* *Response rating of 2*	10
• prepare a preventive maintenance schedule for a heating, ventilating and/or air conditioning system	• a comprehensive preventive maintenance schedule for a given component within a HVAC system. *Assessment Tool* *Activity Assessment: Maintaining/Installing a HVAC System, CON2090–2* *Standard* *The schedule should take into account the frequency and amount of use, condition of use and manufacturer's recommendations* *Performance rating of 2 for each applicable task*	20

MODULE CON2090: CLIMATE CONTROL SYSTEMS (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• service or install a heating, ventilating and/or air conditioning system	• demonstration of skills related to the installation and/or servicing of a typical residential HVAC component. *Assessment Tool* *Activity Assessment: Maintaining/Installing a HVAC System, CON2090–2* *Standard* *Installation and servicing procedure are performed according to the manufacturer's recommendations* *Performance rating of 2 for each applicable task*	60
• profile a trade or occupation within the heating and air conditioning fields	• presentation of an occupation/trade profile that outlines: – description of the occupation and working conditions – present and future employment opportunities – training centres and requirements. *Assessment Tool* *Research Process: Career Opportunities in Heating & Air Conditioning, CON2090–3* *Standard* *Performance rating of 2 for each applicable task*	10
• demonstrate basic competencies.	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

MODULE CON2090: CLIMATE CONTROL SYSTEMS (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation • Heat Transfer	• research the methods heat is transferred; e.g.: – convection – radiation – gravity	This module can be effectively combined with the sheet metal modules found in Fabrication Studies.
	• identify the parts of a typical HVAC system	
	• compare hot water and forced air heating	
	• identify and describe the types of warm/cold air distribution systems; e.g.: – perimeter loop – radial – trunk and branch	Stress the importance of having a well-designed HVAC system to achieve greater comfort and efficiency.
• Design	• explain how heating systems are sized, number of outlets calculated and locations determined	Discuss the effects of window and tree locations on room temperature.
	• examine a typical heating system and determine how room temperatures are regulated	
	• explain the effects on air quality when there is a lack of ventilation	
	• identify the service routines that should be followed for a heating and cooling system.	
Planning and Management	• describe the cost-effectiveness of heating with various fuels	Discuss the use of computer controls in regulating air temperature.
	• prepare a layout for a part of a HVAC system OR • prepare a service schedule for HVAC component.	
Implementation	• assist in the installation of a HVAC system OR • service a component of a HVAC system.	

MODULE CON2090: CLIMATE CONTROL SYSTEMS (continued)

Concept	Specific Learner Expectations	Notes
Assessment • Career Information • Career Preparation	*The student should:* • identify employment and further training opportunities related to heating and air conditioning • analyze personal interests and abilities related to making realistic career choices • maintain a record of completed activities within a portfolio.	

MODULE CON2100: AGRI-STRUCTURES

Level: Intermediate

Theme: Building Systems (Processes and Applications)

Prerequisite: CON1070 Building Construction

Module Description: Students apply construction principles and skills, and use preengineered designs to build a structure to be used for agricultural purposes.

Module Parameters: Access to a building site and/or construction facilities and to instruction from an individual with specialized training in carpentry or metal work.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• identify the major issues that must be addressed when designing an agri-structure	• presentation of a written project brief that identifies and describes the major factors to be considered when designing, planning and constructing an agri-structure, such as: – human and environmental safety – animal comfort and safety – crop protection – cost of construction	10
• read and interpret the appropriate drawings and specifications to create a material and cost estimate	• appropriate design selection, modification or creation of an agri-structure design that meets Alberta Agriculture standards and local code requirements	20
• construct a structure for use in agriculture	• demonstration of appropriate construction and fabrication skills. *Assessment Tool* *Project Assessment: Building an Agri-Structure, CON2100–1* *Standard* *The appropriate materials are selected and ordered. The structure should be accurately laid out, assembled and finished according to conventional building practices* *Performance rating of 2 for each applicable task*	70

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Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • demonstrate basic competencies.	*Assessment of student achievement should be based on:* • observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation • Materials and Structures	• describe the types of materials and structures used in agriculture businesses • list the factors that affect the choice of materials and design of agri-structure such as: – human and environmental safety standards – animal comfort and safety – crop protection – conditions of use – ease of construction and maintenance – material cost.	This module provides students with the opportunity to apply basic construction principles and practices to farm-type buildings and structures.
Planning and Management • Structural Designs	• produce/select an agri-structure design that: – uses two or more types of structural materials – applies basic construction principles and processes – meets industry standards	
• Estimating and Scheduling	• estimate the cost of materials and prepare a work schedule.	

Concept	Specific Learner Expectations	Notes
	The student should:	
Implementation • Material Processing	• use the appropriate tools materials and processes to construct and finish a structure.	
Assessment • Career Preparation	• maintain a record of completed activities within a portfolio.	

MODULE CON2120: MULTIPLE MATERIALS

Level: Intermediate

Theme: Manufacturing Systems (Processes and Applications)

Prerequisite: CON1120 Project Management

Module Description: Students develop a product that incorporates two or more types of material in its construction.

Module Parameters: Access to a fully equipped materials facility and to instruction from an individual with specialized training in the use of common materials and tools.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• identify advantages of using different materials in a product	• knowledge of the properties of common structural materials and formulation of criteria for using unlike materials for a given application. *Assessment Tool* *Project Assessment: Products from Multiple Materials, CON2120–1* *Standard* *Presentation should include the identification of relevant properties and choice based on appearance, serviceability and cost of materials* *Performance rating of 2 for each applicable task*	10
• apply knowledge of structural materials, planning, and construction techniques to produce a product from different materials	• the demonstration of production skills to produce a product made from two or more different materials.	70
	Assessment Tool *Project Assessment: Products from Multiple Materials, CON2120–1* *Standard* *The project should be built using the appropriate materials, joinery and finishing techniques; all joints are to be tight fitting and square; finishes are to be smooth and free from production defects. Overall dimensions should be ± 2 mm* *Performance rating of 2 for each applicable task*	20

MODULE CON2120: MULTIPLE MATERIALS (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • demonstrate basic competencies.	*Assessment of student achievement should be based on:* • Observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation		
• Material Characteristics	• describe the properties of common production materials • research and state the reasons for using combinations of wood, metal, plastic, ceramic and other materials	Base reasons on: • appearance • serviceability • ease of construction • strength • cost • etc.
• Fastening and Finishing Systems	• identify the methods by which different materials are fastened together • identify the types of finishes that are compatible with wood, metal, plastic, ceramic and other surfaces	Consider mechanical means as well as bonding agents.
• Health and Safety	• identify health and safety concerns associated with a given material.	Refer to WHMIS Material Safety data sheets for appropriate handling use and storage of materials.

MODULE CON2120: MULTIPLE MATERIALS (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Planning and Management		
• Product Design	• select, modify or design a product that incorporates two or more materials in its construction • select compatible finishes	
• Work Scheduling	• create a cutting list and cost estimate • prepare a detailed sequence of operations that facilitates the safe and efficient use of materials and tools.	
Implementation		
• Material Processing	• use the appropriate tools and supplies to safely: – measure and lay out components – cut and remove waste from materials – form components where required – fasten or bond components – align and clamp components – prepare for finishing	
• Finishing	• finish the product using appropriate finishes.	
Assessment		
• Quality Control	• identify indicators of a quality product	Discuss issues related to appearance, serviceability, workmanship and cost-effectiveness.
• Career Preparation	• maintain a record of completed activities within a portfolio.	

MODULE CON2130: FURNITURE MAKING 1 (BOX CONSTRUCTION)

Level: Intermediate

Theme: Manufacturing Systems (Processes and Applications)

Prerequisite: CON1120 Project Management

Module Description: Students develop basic joinery skills and knowledge related to case construction, by producing a box-type piece of furniture.

Module Parameters: Access to a woodworking or materials facility and to instruction from an individual with formal, specialized training in cabinetry/carpentry.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• identify and describe the design features and processes used to construct a box-type furniture product	• analysis of an existing piece of furniture or drawing to correctly determine the: – materials used in surface and structural components – joints and fasteners – type of finish – potential weaknesses and points of wear	15
• apply basic furniture-making skills to plan and construct a piece of furniture based on box construction techniques	• appropriate design/selection or modification of a box-type product that includes a set of working drawings, parts list, costs estimate, sequence of operations and work schedule	20
	• construction of a box-type furniture components or product. *Assessment Tool* *Project Assessment: Box Construction, CON2130–1* *Standard* *The product will be built using the appropriate materials, joinery and finishing techniques; joints are to be tight fitting, flush and square; finishes are to be smooth and free from production defects. Overall dimensions should be within ± 2 mm* *Performance rating of 2 for each applicable task*	65

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • demonstrate basic competencies.	*Assessment of student achievement should be based on:* • observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation		
• Box Construction	• research typical design and joinery techniques that are commonly used in box construction • identify additional construction features such as: – door – drawer – plinth	This module can be combined with subsequent modules to accommodate more elaborate features such as doors, drawers and a plinth.
• Tool Safety	• describe the safe set-up and operation of hand and/or power tools to make a series of joints; e.g.: – reinforced butt – reinforced miter – rabbet – dado – finger	Review the safe use of the appropriate tools to make a specific joint, such as dado head, router, biscuit joiner.
	• identify and describe the use of common fasteners and clamping procedures used with a specific joint	Identify recommended adhesives in relation to intended use and type of joint.
• Fittings	• identify common fittings and construction techniques used to make: – flush – sliding – tambour – fall flap doors.	

MODULE CON2130: FURNITURE MAKING 1 (BOX CONSTRUCTION) (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Planning and Management		
• Product Design	• select a box-type product that requires the use of: – solid wood and/or composites – a variety of joints and fasteners – typical lay-up and clamping procedures	Suggest products such as: • jewelry box • shelving unit • hope chest • speaker enclosure.
• Estimating	• prepare a material list and cost estimate from a working drawing	
• Work Scheduling	• prepare a work schedule.	
Implementation		
• Material Processing	• use the appropriate tools, materials and processes to: – measure and lay out stock – cut stock to size – machine surfaces and joints – lay-up, glue, fasten and clamp – fill or plug exposed fasteners – prepare for finishing.	This project can be finished in conjunction with CON2150: Finishing & Refinishing.
Assessment		
• Career Information	• identify the types of skills that are required of custom furniture builders	Discuss the need to be able to: • read drawings • calculate and measure accurately • use effective planning and problem-solving strategies • use equipment and materials safely.
• Career Preparation	• maintain a record of completed activities within a portfolio.	

MODULE CON2140: FURNITURE MAKING 2 (FRAME & PANEL)

Level: Intermediate

Theme: Manufacturing Systems (Processes and Applications)

Prerequisite: CON1120 Project Management

Module Description: Students use solid and/or composite materials to build a frame and panel product or component.

Module Parameters: Access to a woodworking or materials facility and to instruction from an individual with formal specialized training in cabinetry/carpentry.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• identify and describe the design features and processes used to construct a frame and panel product	• analysis of an existing piece of furniture or drawing to correctly determining the: – materials used in surface and structural components – joints and fasteners – potential weakness and points of wear	10
• apply basic furniture-making skills to plan and construct a component or piece of furniture based on frame and panel construction techniques	• appropriate design selection, modification or creation of a frame and panel product or component that includes a set of drawings, parts list, cost estimate, sequence of operations and work schedule	20
	• construction of a frame and panel product or component. *Assessment Tool* *Project Assessment: Frame and Panel Construction, CON2140–1* *Standard* *The project will be built using the appropriate materials, joinery and finishing techniques; all joints are to be tight fitting and square; finishes are to be smooth and free from production defects. Overall dimensions should be within ± 2 mm* *Performance rating of 2 for each applicable task*	70

MODULE CON2140: FURNITURE MAKING 2 (FRAME & PANEL) (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • demonstrate basic competencies.	*Assessment of student achievement should be based on:* • observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation		
• Frame and Panel Construction	• identify the construction details of a typical frame and panel component • identify the typical wood joints that are used in frame and panel construction	Point out the need to accommodate the movement of the panel within the frame.
• Fastening Systems	• identify and describe the types of fastening systems that are used in flat frame construction; e.g.: – reinforcing plates – dowelling – biscuits – splines	
• Tool Safety	• describe the safe set-up and operation of hand and/or power tools used to make a series of joints; e.g.: – mortise and tenon – dowel – biscuit – lap – miter – loose tenon.	

MODULE CON2140: FURNITURE MAKING 2 (FRAME & PANEL) (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Planning and Management		
• Product Design	• select a frame and panel product or component that requires: – interpretation and development of simple working drawings – use of solid woods and/or composites – use of a variety of wood joints, fasteners and other hardware components – typical lay-up and clamping procedures	
• Work Scheduling	• show a detailed material list, cost estimate and work schedule.	
Implementation		
• Material Processing	• use the appropriate tools, machines and processes to: – measure and lay out stock – cut stock to size – machine and fit joints – lay-up, glue, fasten and/or clamp – fill or plug exposed fasteners (where applicable) – finish the project.	This project can be finished in conjunction with CON2150: Finishing & Refinishing.
Assessment		
• Career Preparation	• maintain a record of completed activities within a portfolio.	

MODULE CON2150: FINISHING & REFINISHING

Level: Intermediate

Theme: Manufacturing Systems (Processes and Applications)

Prerequisite: CON1010 Basic Tools & Materials

Module Description: Students use knowledge of finishing materials and finishing techniques to apply new and replacement finishes.

Module Parameters: Access to a woodworking or materials facility and to instruction from an individual with specialized training in finishing/refinishing.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• identify common finishes and finishing/refinishing techniques	• a written or oral response that identifies common finishes and application techniques, health hazards associated with the handling and storage of finishing materials. *Assessment Tool* *Response Assessment: Common Finishes and Finishing Techniques, CON2150–1* *Standard* *Response rating of 2*	20
• identify and describe the health hazards and Workplace Hazardous Materials Information System (WHMIS) regulations associated with the products used in finishing/refinishing		10
• demonstrate appropriate finishing/refinishing techniques	• application of finishing skills to finish/refinish a piece of furniture *Assessment Tool* *Activity Assessment: Product Finishing, CON2150–2* *Standard* *Finish should be applied according to the manufacturer's recommendations. Finished surfaces are consistent smooth, free of runs and dust particles* *Performance rating of 2 for each applicable task*	70

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • demonstrate basic competencies.	*Assessment of student achievement should be based on:* • observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation		
• Refinishing	• describe techniques that are used to: – identify an existing finish – remove a stain or finish – prepare a surface for refinishing	Avoid working with finishes that contain lead.
• Conditioning	• explain: – bleaching and staining – filling and sealing – creating a distressed finish	
• Finishes	• identify common finishes and applications	Discuss the use of: • oil • shellac • varnish • lacquer • urethane • epoxy • finishes.
• Sealers and Fillers	• explain the purpose of a filler and sealer	
	• identify the preferred method of applying each of the above finishes such as brush, roller, rag, spray gun	
	• describe what thinners and cleaners are used in conjunction with a given finish	Explain why it is important to use the appropriate finish remover and thinner.

MODULE CON2150: FINISHING & REFINISHING (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
• Health and Safety	• describe the manufacturers' recommendations and WHMIS regulations that apply to the use and storage of a given product.	Students need to understand the purpose and use of product labels and material safety data sheets.
Planning and Management	• for a refinishing project: – identify the nature of the existing finish and finish removers – identify appropriate personal protective equipment • for new and old surfaces: – select a suitable new or replacement finish – prepare a detailed set of step-by-step finishing procedures – clean the product and the work site.	Review the appropriate procedures for disposing of waste materials.
Implementation		
• Finishing Processes	• use the appropriate tools, materials and techniques to: – remove an existing finish – stain and seal – apply the necessary top coats – sand, rub and polish as required	Point out the importance of working in a clean and well-ventilated work area.
• Safety	• discard all rags and used materials in the appropriate containers.	
Assessment		
• Quality Control	• identify ways to improve the quality of a finish	
• Career Preparation	• maintain a record of completed activities within a portfolio.	

MODULE CON2160: CABINETMAKING 1 (WEB & FACE FRAME)

Level: Intermediate

Theme: Manufacturing Systems (Processes and Applications)

Prerequisite: CON1120 Project Management

Module Description: Students apply web and face frame construction techniques, and use solid and/or manufactured materials to produce a built-in or modular cabinet.

Module Parameters: Access to a woodworking or materials facility and to instruction from an individual with specialized training in cabinetry/carpentry.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• identify and describe the design features and processes used to construct a web and face frame product	• analysis of a typical web and face frame product or drawing that correctly identifies and describes the types of: – materials and finishes – joints and methods of fastening to a box structure – potential weaknesses and points of wear	10
	and	
• prepare a detailed material list and event sequence	• demonstration of appropriate estimating and event scheduling skills. *Assessment Tool* *Project Assessment: Web and Face Frame Construction, CON2160–1* *Standard* *Materials list is accurately determined using a working drawing, events are identified and scheduled in a safe and logical sequence of operations* *Performance rating of 2 for each applicable task*	15

MODULE CON2160: CABINETMAKING 1 (WEB & FACE FRAME) (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• build a cabinet using web and face frame construction techniques	• application of web and face frame construction skills and techniques. *Assessment Tool* *Project Assessment: Web and Face Frame Construction, CON2160-1* *Standard* *The project should be built using the appropriate materials, joinery and finishing techniques. All joints are to be tight fitting, flush and square; finishes are to be smooth and free from production defects. Overall dimensions are within ± 2 mm* *Performance rating of 2 for each applicable task*	75
• demonstrate basic competencies.	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation		
• Construction Methods	• describe the principal methods used to construct a built-in cabinet; e.g.: – on-site construction – modular system	For more elaborate projects, this module can be combined with other cabinetry modules.
• Tool Safety	• identify the parts of a web frame cabinet • describe the types of joints used in web and face frame construction	Review the use of a table/radial arm saw and compound miter saw.
	• describe safe set-up procedures to make common joints associated with web and face frame construction • identify the appropriate fastening systems used in economy and premium grade construction.	Discuss procedures used to make dowel, biscuit and pocket holes.

MODULE CON2160: CABINETMAKING 1 (WEB & FACE FRAME) (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Planning and Management		
• Design	• select or modify a cabinet drawing that uses web and face frame construction	
• Work Scheduling	• create a work schedule • prepare a material cutting list.	
Implementation		
• Material Processing	• use the appropriate tools, materials and processes to: – measure and lay out materials – rough-out materials – machine joints and surfaces – assemble, glue, fasten and clamp – fill, scrape and sand.	
Assessment		
• Career Information	• analyze and compare the differences between a production cabinetmaker and custom cabinetmaker	
• Career Preparation	• maintain a record of completed activities within a portfolio.	

MODULE CON2170: CABINETMAKING 2 (DOOR & DRAWER)

Level: Intermediate

Theme: Manufacturing Systems (Processes and Applications)

Prerequisite: CON1120 Project Management

Module Description: Students use solid and composite materials to develop skills in building cabinet doors and drawers.

Module Parameters: Access to a woodworking or materials facility and to instruction from an individual with formal, specialized training in cabinetry/ carpentry.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• identify and describe common methods of designing and constructing cabinet doors and drawers	• analysis of existing door and drawer products or drawings to determine: – the structural materials – the parts of a typical door and drawer – two or more edge treatments used on a door – two or more types of joints used in a drawer construction – two or more types of hinge and slide hardware	15
• apply cabinetmaking skills to plan and construct door/drawer components	• the construction of a door and drawer product or component. *Assessment Tool* *Project Assessment: Door and Drawer Construction, CON2170–1* *Standard* *The project should be built using the appropriate materials, joinery and finishing techniques; all joints are to be tight fitting and square; finishes are to be smooth and free from production defects. Overall dimensions should be within ± 2 mm* *Performance rating of 2 for each applicable task*	75

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• profile a trade or occupation within the cabinetmaking field	• presentation of an occupation profile that outlines: – type of work and working conditions – present and future employment opportunities – training and entry requirements. *Assessment Tool* *Research Process: Career Opportunities in the Cabinetry Trade, CON2170–2* *Standard* *Performance rating of 2 for each applicable task*	10
• demonstrate basic competencies.	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation		
• Door and Drawer Construction	• research methods of producing various door treatments such as raised panel, flush and glass inset	Compare the design features of various drawer guide systems.
• Tool Safety	• research common door and drawer construction techniques and hardware options	
	• identify the common joints used in door and drawer construction	
	• identify the equipment and describe safe set-up procedures to make a given drawer and door component.	Demonstrate methods to make a typical: – stile and rail – raised panel – inlay door component.

MODULE CON2170: CABINET MAKING 2 (DOOR & DRAWER) (continued)

Concept	Specific Learner Expectations	Notes
Planning and Management	*The student should:*	
• Design	• select or modify a cabinet drawing of a drawer and built-up door • select the appropriate door and dresser material • identify an appropriate door guiding system	Discuss the different quality levels of door and drawer construction and hardware.
• Work Scheduling	• create a material and procedural list.	
Implementation		
• Material Processing	• use the appropriate tools, materials and processes to: – measure and lay out materials – machine surfaces and joints – assemble, glue, fasten and clamp – prepare for finishing.	Finishing may be completed in CON2150: Finishing & Refinishing.
Assessment		
• Career Information	• identify specific employment and further training opportunities related to custom and factory-made cabinets	
• Career Preparation	• maintain a profile of completed activities within a portfolio.	

MODULE CON2180: WOOD FORMING

Level: Intermediate

Theme: Manufacturing Systems (Processes and Applications)

Prerequisite: CON1120 Project Management

Module Description: Students apply skills in mold making and wood conditioning to make a formed part or component.

Module Parameters: Access to a woodworking or materials facility and to instruction from an individual with specialized training in woodworking.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• describe common wood forming techniques	• a written or oral response that correctly identifies describes three wood forming techniques. *Assessment Tool* *Response Assessment, Bending and Laminating, CON2180–1* *Standard* *Response rating of 2*	10
• build or obtain the necessary molds and clamping devices to bend a piece of solid stock or wood laminate	• construction/set-up of tools required to bend a piece of solid or laminated stock. *Assessment Tool* *Product Assessment: Wood Formed Products, CON2180–2* *Standard* *Molds allow for even application of pressure and protect surface from unnecessary blemishes* *Performance rating of 2 for each applicable task*	20
• apply wood forming skills and techniques to make a product or component	• application of wood forming techniques and skills to create a product with one or more formed components. *Assessment Tool* *Project Assessment: Wood Formed Products, CON2180–2* *Standard* *The appropriate materials are selected and bent accurately so as to provide a tight fit to all adjoining components. An individual product is accurate to the original design* *Performance rating of 2 for each applicable task*	70

MODULE CON2180: WOOD FORMING (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • demonstrate basic competencies.	*Assessment of student achievement should be based on:* • observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
Orientation • Forming Techniques • Forming Materials	*The student should:* • research and describe typical methods of bending solid stock and laminates; such as soaking in water, steaming or chemical conditioning • describe how to determine the correct spacing for cross and parallel kerfing • describe a system to moisten or steam wood (plasticize) prior to bending • identify woods that lend themselves to cold water or steam bending • identify methods of building up – molding and clamping veneer stock • select the most appropriate adhesive for a given application and process.	Discuss the inherent dangers associated with the use of steam.
Planning and Management • Design • Material	• select or design a formed product or component • calculate the spacing of kerfs for a given radius bend • design a mold for bending or contouring solid stock • obtain suitable stock for bending.	Products might include: • furniture components • recreational equipment • marine structures.

Concept	Specific Learner Expectations	Notes
Implementation • Material Processing	*The student should:* • use the appropriate tools, materials and processes to: – prepare solid and/or veneer stock for bending – condition, glue and secure – release and finish.	Discuss the importance of using stock that is free from knots and cross-grained sections.
Assessment • Career Preparation	• maintain a record of completed activities within a portfolio.	

MODULE CON2190: MANUFACTURING SYSTEMS

Level: Intermediate

Theme: Manufacturing Systems (Processes and Applications)

Prerequisite: None

Module Description: Students investigate the nature of manufacturing systems used to produce durable goods.

Module Parameters: Access to in-school and community resources related to manufacturing.

Supporting Module: CON1010 Basic Tools & Materials

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• describe current production systems used to manufacture durable goods • identify the lines of communication and decision making in a typical production system • explain how the production of durable goods is being altered by the effects of technology and the global economy	• the analysis of two systems of production currently in use and the presentation of a report that emphasizes the: – advantages and disadvantages of each system – lines of communication and decision making processes typical to each system – how these systems are being altered to meet the needs of and competition in a global economy. *Assessment Tool* *Assessment Framework: Presentations/Reports, CONPRE* *Standard* *Performance rating of 2 for each applicable task*	100
• demonstrate basic competencies.	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation		
• History of Manufacturing	• describe the development of modern manufacturing from its early routes in the domestic, cottage and factory systems • explain the advantages and disadvantages of a strong manufacturing base in a community • describe the operations of a typical manufacturing system's input requirements, types of processes and outputs as well as its feedback mechanisms	This module is investigative in nature. Students should be encouraged to visit local manufacturers to obtain much of their information base.
• Economic Advantages	• show how a typical manufacturer is able to: – increase productivity – provide for choice – reduce skill level requirements – reduce costs per unit produced • describe how computer-assisted manufacturing, just-in-time and total quality management systems increase: – productivity – quality – profitability	
• Organization	• research a manufacturing company and describe its: – organizational structure – methods of decision making – methods of financing – training practices – research and development – marketing practices • explain why manufacturers are interested in locating near: – skilled population bases – resources – markets	If possible, have students arrange an interview with a local manufacturer.

MODULE CON2190: MANUFACTURING SYSTEMS (continued)

Concept	Specific Learner Expectations	Notes
- Global Impact	*The student should:* - describe the place organized labour has in manufacturing - explain how manufacturing is being altered by our global economy and the use of technology.	

MODULE CON2200: PRODUCT DEVELOPMENT

Level: Intermediate

Theme: Manufacturing Systems (Processes and Applications)

Prerequisite: CON1010 Basic Tools & Materials

Module Description: Students work, individually or as team members, to research, design and build a product suitable for mass production and marketing.

Module Parameters: Access to a materials/construction facility and to instruction from an individual with specialized training in the use of tools and materials.

Supporting Module: CON2190 Manufacturing Systems

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• list and describe the steps involved in developing a product for manufacturing	• presentation of a group or individually prepared report that list and describes the steps in developing a product for manufacturing, such as: – defining the problem – research possible solutions – creating solutions – determining marketability – determining profit margin	20
• apply designing and planning skills to assist in the development of a prototype	• demonstrate design and planning skills required in the development of a prototype product. *Assessment Tool* *Project Assessment: Building a Prototype, CON2200–1* *Standard* *Performance rating of 2 for each applicable task*	50
• describe the marketing and manufacturing potential of a product	• evaluation of a product prototype to determine whether it meets the desired design, production and marketing criteria. *Assessment Tool* *Illustrative Example, CON2200–2* *Standard* *Performance rating of 2 for each applicable task*	30

MODULE CON2200: PRODUCT DEVELOPMENT (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • demonstrate basic competencies.	*Assessment of student achievement should be based on:* • observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation • Product Life Cycle	• describe the life cycle of a typical product from the time of introduction to its decline • identify reasons for a product being successful; e.g.: – meet a physical and emotional need – marketing practice – pricing – reputation	Note the importance of considering the issues related to product disposal and/or recycling in the initial design stages of a product.
• Idea Generation	• explain how new product ideas are generated • outline how ideas are developed into new products • identify the major steps involved in engineering a new product	Students should be encouraged to create a new product, not simply replicate an existing one.
• Testing	• state the importance of product testing and market surveys.	

MODULE CON2200: PRODUCT DEVELOPMENT (continued)

Concept	Specific Learner Expectations	Notes
Planning and Management • Prototype Development	*The student should:* • select or design a product for manufacturing • create the necessary detail, assembly and schematic drawings • identify the appropriate materials • create a prototype product • analyze the design: – function – aesthetic appeal – reliability – manufacturability – profitablity • create a market survey.	
Implementation	• create a prototype product • test the product • prepare a market survey.	
Assessment • Career Assessment • Career Preparation	• identify career opportunities related to product marketing and research • maintain a record of completed activities within a portfolio.	

MODULE CURRICULUM AND ASSESSMENT STANDARDS:

SECTION F: ADVANCED LEVEL

The following pages define the curriculum and assessment standards for the advanced level of Construction Technologies.

Advanced level modules demand a higher level of expertise and help prepare students for entry into the workplace or a related post-secondary program.

Module CON3010: Concrete Work (Structures & Finishes) F.3
Module CON3020: Masonry Work (Structures & Finishes) F.7
Module CON3030: Wall & Ceiling Finishing F.11
Module CON3040: Stair Construction F.15
Module CON3050: Roof Structures 2 (Framing & Covering) F.19
Module CON3060: Doors & Trim F.23
Module CON3070: Floorcovering F.27
Module CON3080: Energy-efficient Housing F.31
Module CON3090: Renovations/Restorations F.35
Module CON3100: Commercial Structures F.39
Module CON3110: Site Management F.43
Module CON3120: Tool Maintenance F.47
Module CON3130: Furniture Making 3 (Leg & Rail) F.51
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Module CON3170: Cabinetmaking 4 (Layout & Installation) F.67
Module CON3190: Production Planning F.71
Module CON3200: Production Management F.75
Module CON3210: Framing Systems 2 (Floor, Wall & Ceiling) F.79

MODULE CON3010: CONCRETE WORK (STRUCTURES & FINISHES)

Level: Advanced

Theme: Building Systems (Processes and Applications)

Prerequisite: CON1070 Building Construction

Module Description: Students develop essential skills to form, place and finish a concrete project.

Module Parameters: Access to a building site and/or construction facility and to instruction from an individual with specialized training in concrete work.

Supporting Modules: CON2010 Site Preparation
CON2020 Concrete Forming

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• identify and describe concrete forming, placing and finishing techniques	• a written report or display that accurately represents accepted forming, placing and finishing trade practices. *Assessment Tool* *Research Process: Concrete Forming, Placing and Finishing, CON3010–1* *Standard* *Performance rating of 3 for each applicable task*	20
• use the appropriate tools, materials and processes to form, reinforce, place and finish a concrete structure	• demonstration of concrete forming, placing and finishing techniques. *Assessment Tool* *Assessment Framework: Activity Assessment, CONACT* *Standard* *The project should be free of voids and finished in a manner appropriate to its application* *Performance rating of 3 for each applicable task*	65
• create a profile of a trade or occupation within the field of concrete work	• presentation of an occupational profile that includes a description of working conditions, employment and training opportunities related to concrete work. *Assessment Tool* *Research Process: Concrete Forming, Placing and Finishing, CON3010–1* *Standard* *Performance rating of 3 for each applicable task*	15

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MODULE CON3010: CONCRETE WORK (STRUCTURES & FINISHES) (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • demonstrate basic competencies.	*Assessment of student achievement should be based on:* • observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation		
• Concrete Mixing and Testing	• research the effect aggregate, water and cement ratios have on the workability and quality of a concrete mix	Emphasize the importance of using clean aggregate and water.
	• list and describe the purpose of different cement types	
	• identify the types of tests and reasons for concrete testing	Demonstrate the slump test and describe compression testing.
• Forming	• describe standard forming and reinforcing practices for a project; e.g.: – slab on grade – retaining wall – poured stairs	Explain why rebar should be free of loose rust, scale grease and other foreign matter.
	• explain the purpose of a control and expansion joint in a concrete structure	
• Placement and Finishing	• identify the purpose and describe the process of: – screeding – puddling – striking off – floating – troweling – finishing – curing	Identify required protection of rebar exposed to the weather or ground.
• Fasteners	• describe common methods of installing fasteners in concrete before and after the concrete has set up and cured	

MODULE CON3010: CONCRETE WORK (STRUCTURES & FINISHES) (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
• Tool Safety	• describe the safe use and storage of explosive actuated tools and supplies • identify power loads and strengths for a given application • describe prefiring and firing routines.	Students need to recognize the training requirements and the hazards associated with explosive actuated tools.
Planning and Management	• select a concrete project that requires: – forming – reinforcement – consolidation and finishing	A typical shop project may include sidewalk blocks, truck weights, sundial or birdbath.
• Material and Work Scheduling	• produce a list of materials and schedule of events for an on-site project.	On-site projects could include slab on grade, steps or retaining wall.
Implementation • Material Processing	• use the appropriate tools, materials and processes to: – prepare the grade and base – assemble/build and condition a form – install damp-proof member – fabricate and install the required reinforcement – mix/order, place and consolidate – impart desired finish/colour – provide proper curing conditions – remove forms.	Discuss the type of finishes and colours that can be obtained on a concrete surface.
Assessment • Career Information	• identify the employment and training opportunities related to: – product distribution – concrete testing – engineering – concrete placing and finishing • assess personal interests and abilities related to making realistic career choices	Students need to be aware that because concrete is used extensively in residential, commercial and civil construction, it provides a large number of career opportunities.
• Career Preparation	• maintain a record of completed work within a portfolio.	

MODULE CON3020: MASNRY WORK (STRUCTURES & FINISHES)

Level: Advanced

Theme: Building Systems (Processes and Applications)

Prerequisite: CON1070 Building Construction

Module Description: Students develop basic knowledge and skills related to masonry materials, structures and finishes.

Module Parameters: Access to a building site and/or construction facility and to instruction from an individual with specialized training in masonry work.

Supporting Module: CON3010 Concrete Work (Structures & Finishes)

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• identify and describe common types of masonry materials and finishes	• written response that correctly identifies and describes three different masonry materials and finishes. *Assessment Tool* *Research Process: Masonry Materials and Finishes, CON3020–1* *Standard* *Performance rating of 3 for each applicable task*	10
• read and interpret a working drawing to prepare a cost estimate of a masonry surface	• preparation of a cost estimate that includes cost of materials and labour	15
• apply masonry skills to assist in the application of a masonry finish or in the construction of a masonry structure	• demonstration of acceptable works skills in relation to the application of a masonry finishes or construction of a masonry structure. *Assessment Tool* *Assessment Framework: Activity Assessment, CONACT* *Standard* *Finishes are applied and structure built in keeping with accepted trade practice* *Performance rating of 3 for each applicable task*	65

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• create a profile of a trade or occupation within the field of masonry work	• presentation of an occupational profile that includes: – working conditions – employment opportunities – training and entry requirements – describe opportunities for career advancement and self employment. *Assessment Tool* *Research Process: Masonry Materials and Finishes, CON3020–1* *Standard* *Performance rating of 2 for each applicable task*	10
• demonstrate basic competencies.	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation • Brick Veneering	• explain reasons for using a masonry finish over other types of finishes	Discuss factors such as: • appearance • durability • lower upkeep • lower risk of fire.
	• analyze a brick veneer wall section and determine the method that is used to: – support the weight of the brick – attach the bricks to the wall surface – prevent moisture build-up between the wall surfaces	
	• describe the different sizes, textures and grades of bricks	
	• identify common types of patterns and bonds used in brick structures and veneering	

MODULE CON3020: MASONRY WORK (STRUCTURES & FINISHES) (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
• Brick Veneering (continued)	• list and describe the basic tools that are used in laying brick and concrete blocks • describe the techniques that are used to: – cut brick – keep courses level and plumb – build a lead – tool joints	If possible, have students visit a building site to observe how bricks are laid.
• Stuccoing	• examine a stucco wall section and identify the: – moisture barrier – corner and stop beads – lath or wire – scratch coat – screeds – finish coat • identify common finishes and methods of application such as: – smooth – spatter – old English • identify the differences and similarities between applying a stucco finish to a frame wall and applying parging to a cement or block wall • describe the steps that are taken to compensate for extreme weather conditions.	
Planning and Management		
• Mixing Proportions	• describe the proper mixing proportions to prepare a mortar, stucco and parging mix	
• Estimating	• estimate the amount of materials required to brick veneer a wall section, stucco or parge a surface.	

MODULE CON3020: MASONRY WORK (STRUCTURES & FINISHES) (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Implementation • Material and Tool Processes	• use appropriate materials, tools and techniques to: – apply a brick veneer finish or build a brick structure – stucco or parge a wall surface.	Students can gain experience laying brick using a non-permanent mortar.
Assessment • Career Information	• identify specialized training and skills required in the masonry trades • research the job opportunities, working conditions and wages paid to masonry workers • analyze personal interests and abilities related to making realistic career choices	
• Career Preparation	• maintain a record of completed activities within a portfolio.	

MODULE CON3030: WALL & CEILING FINISHING

Level: Advanced

Theme: Building Systems (Processes and Applications)

Prerequisite: CON1070 Building Construction

Module Description: Students develop basic knowledge and skills to insulate, install and finish an interior wall/ceiling surface.

Module Parameters: Access to a building site and/or construction facility and to instruction from an individual with specialized training in carpentry.

Supporting Module: CON2040 Framing Systems 1 (Floor & Wall)

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• describe the procedures related to the installation of insulation and vapour barrier to an exterior wall and ceiling	• a written response that correctly describes the procedures employed in the selection and installation of insulation, vapour barrier and wall/ceiling boards	25
• identify and describe the health hazards and safety precautions associated with the use of insulating, drywalling and finishing materials	• the identification of health and safety issues related to the handling and use of insulation and wallboard materials. *Assessment Tool* *Response Assessment: Insulating and Drywalling, CON3030–1* *Standard* *Response rating of 3*	
• prepare, apply and finish a wall and ceiling surface	• demonstration of appropriate skills and techniques in the application of a wall/ceiling treatment given an on-site or mock-up project. *Assessment Tool* *Activity Assessment: Installing and Finishing Drywall, CON3030–2* *Standard* *Materials have been selected and installed in keeping with the specifications, accepted trade practice and local code requirements.* *Surfaces are finished smooth and free of voids* *Performance rating of 3 for each applicable task*	75

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • demonstrate basic competencies.	*Assessment of student achievement should be based on:* • observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation		
• Materials	• list and describe the types of wall and ceiling insulation and soundproofing materials	Not only does insulation reduce heat loss, it also can retard the spread of sound and fire.
	• describe the different types of drywall and conditions of use	
	• identify the building codes that relate to the installation of insulation, vapour barrier and drywall	
	• identify and describe the different types of tapes, corner beads, adhesives and fastening devices used with gypsum board	
• Material Application	• describe methods of cutting, attaching, taping, filling, sanding and texturing a gypsum board	Avoid fillers that contain asbestos and paints that contain lead.
	• describe methods of making repairs to small and large holes in a drywall surface	
	• identify the materials used to paint and decorate a wall surface	
	• research common methods used to apply paint to a surface; e.g., – brush – roller – spray.	

MODULE CON3030: WALL & CEILING FINISHING (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Planning and Management		
• Estimating	• estimate the amount and type of drywall, insulation, vapour barrier, paint and decorating supplies required to install and finish a wall or ceiling surface	Students should be aware of the regulations regarding the transportation of dangerous goods and the use of hazardous materials.
• Pre-installation Processes	• check alignment of studs and identify starting points • mark stud locations on floor and ceiling • install metal protectors for wiring and plumbing where necessary	
• Health and Safety	• identify and locate appropriate personal protective equipment.	Refer to Materials Safety Data Sheets (MSDS) when using hazardous finishing and decorating supplies.
Implementation		
• Material Processing	• use the appropriate tools, materials and processes to: – install insulation, vapour barrier and gypsum board – tape, fill, sand, texture, paint as required – repair a gypsum board surface – seal, paint and/or apply a wall covering.	If on-site work is unavailable, consider using a mock-up project. Stress the importance of using the proper personal protective equipment.
Assessment		
• Career Information	• describe the working conditions and skills required of a drywall mechanic and/or painter/decorator	
• Career Preparation	• maintain a record of completed activities within a portfolio.	

MODULE CON3040: STAIR CONSTRUCTION

Level: Advanced

Theme: Building Systems (Processes and Applications)

Prerequisite: CON1070 Building Construction

Module Description: Students develop the knowledge and skills required to build a straight flight of stairs.

Module Parameters: Access to a building site and/or construction facility and to instruction from an individual with formal, specialized training in carpentry.

Supporting Module: CON2040 Framing Systems 1 (Floor & Wall)

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• identify and describe different stair types, component parts and construction techniques	• presentation of a written research project that identifies and describes four different stair and stringer types	15
• interpret building code regulations pertaining to residential stair design	• completion of a "Spec Sheet" that outlines the code requirements pertaining to a specific stair application. *Assessment Tool* *Research Process: Stair Construction, CON3040–1* *Standard* *The specifications should accurately address the allowable type and size of nosing, the amount of head room and unit rise and run* *Performance rating of 3 for each applicable task*	15

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• design, lay out and construct a straight flight of stairs	• the construction of a full-size or scaled straight run stair containing no less than three cut-out dadoed or mitered risers. *Assessment Tool* *Activity Assessment; Stair Construction, CON3040–2* *Standard* *The stair or model should conform in all ways to residential codes and standards and fit within the parameters of the stair well opening, total rise, headroom and nosing requirements. All dimensions are to be within ± 3 mm, and all joints should be tight and flush and finished as specified* *Performance rating of 3 for each applicable task*	70
• demonstrate basic competencies.	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation • Stair and Rail Construction	• identify stair types, materials and methods of construction	
	• research and identify the parts of a stair and railing system	Refer to residential code requirements and Occupational Health and Safety guidelines.

Concept	Specific Learner Expectations	Notes
	The student should:	
• Stair and Rail Construction (continued)	• describe the specific building code regulations regarding headroom, rise, run and railing specifications	Refer to local building codes.
	• identify a typical layout procedure for a wooden stringer	
	• research methods of attaching and finishing treads and risers; e.g.: – housed – semi-housed – built-up stringer – notched stringer.	Explain the advantages and disadvantages of the various stair designs from the point of view of cost, ease of construction and strength.
Planning and Management		
• Print Reading	• read and interpret a drawing to determine the: – number of runs and risers – stair width – tread, riser and stringer dimensions – joints – types of materials and fasteners – guard and railing requirements	
• Estimating	• prepare a detailed material list and cost estimate.	
Implementation		
• Material Processing	• use the appropriate tools, materials and processes to: – prefabricate a set of stairs – install a suitable railing – check for code conformity.	
Assessment		
• Career Information	• research business and career opportunities related to prefabricated stair construction and installation	
• Career Preparation	• maintain a record of completed activities within a portfolio.	

MODULE CON3050: ROOF STRUCTURES 2 (FRAMING & COVERING)

Level: Advanced

Theme: Building Systems (Processes and Applications)

Prerequisite: CON2050 Roof Structures 1 (Framing & Finishing)

Module Description: Students develop basic competencies in laying out, cutting and assembling common and hip and valley rafters in relation to specialized structures and coverings.

Module Parameters: Access to a building site and/or construction facility and to instruction from an individual with formal, specialized training in carpentry.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• identify and describe the design features of intersecting sloped roofs	• presentation of a written research project that identifies and graphically illustrates the design features and components of an intersecting roof	20
• calculate the length of rafters, using ratio and proportion techniques	• accurate calculations related to the layout of common, hip, valley and jack rafters. *Assessment Tool* *Research Process: Rafter Construction, CON3050–1* *Standard* *Line length should be calculated to the nearest mm* *Performance rating of 3 for each applicable task*	20
• lay out, cut and assemble a set of rafters for a roof assembly	• application of layout, cutting and assembly skills to make at least one common, one hip or valley and two accompanying jack rafters. *Assessment Tool* *Activity Assessment: Rafter Cutting and Assembly, CON3050–2* *Standard* *Rafters are shortened appropriately and cut to ± 3 mm of the correct length. Angles are within ± 1° and adjoining surfaces are tight fitting* *Performance rating of 3 for each applicable task*	60

MODULE CON3050: ROOF STRUCTURES 2 (FRAMING & COVERING) (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • demonstrate basic competencies.	*Assessment of student achievement should be based on:* • observations of individual effort and interpersonal interaction during the learning process. *Assessment Tools* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation		
• Roof Types and Design Features	• describe roof types and terminology	
	• explain how roof slopes are described and calculated	
	• explain the purpose of a roof overhang	Students should note that flatter roofs require greater overhang to provide protection from the direct rays of the sun.
	• explain how roof dormers and Dutch gables are built	
	• describe three methods of determining the length of a common rafter	
	• describe the types of cuts and features of a: – common rafter – hip and valley rafter – hip and valley jack rafter	Have students see how the Pythagorean Theorem can be applied to roof framing.
• Roofing Materials	• investigate and describe alternate roof coverings such as: – wood shakes – metal shingle – clay tiles.	

MODULE CON3050: ROOF STRUCTURES 2 (FRAMING & COVERING) (continued)

Concept	Specific Learner Expectations	Notes
Planning and Management	*The student should:*	
• Roof Calculations	• from a set of drawings and specifications, calculate the: – roof slope – amount of overhang – length of hip, valley and related jack rafters	Demonstrate how a framing square can be used to determine lengths of rafters and rafter cuts.
	• sketch a rafter plan for a hip and valley roof system	
	• estimate the cost of at least one alternate roof covering	Students should develop and use the slope gain factor.
• Work Scheduling	• create a work schedule and materials list	
	• lay out a rafter pattern for a given slope and type of rafter	
• Worker Safety	• prepare and check the condition of required ladders and scaffolding.	
Implementation		
• Material Processing	• for a given roof section use the appropriate tools, materials and techniques to: – lay out the required patterns – cut the appropriate rafters to size – assemble and fasten – sheath and apply a sample of one or more alternate roof coverings.	
Assessment		
• Career Information	• identify the skills required to be a successful roof framer and finisher	
• Career Preparation	• maintain a record of completed activities within a portfolio.	

MODULE CON3060: DOORS & TRIM

Level: Advanced

Theme: Building Systems (Processes and Applications)

Prerequisite: CON1070 Building Construction

Module Description: Students apply basic finish carpentry knowledge and skills to install doors, railings and moldings.

Module Parameters: Access to a building site and/or construction facility and to instruction from an individual with formal, specialized training in carpentry.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• identify common types of doors, hardware and trim products	• presentation of a written research project that correctly identifies the common types and sizes of sliding, folding and swing doors; related hardware and trim products. *Assessment Tool* *Research Process: Installing Interior Doors and Trim, CON3060–1* *Standard* *Performance rating of 3 for each applicable task*	20
• install doors, moldings and other trim products	• installation of at least one door type and trim product. *Assessment Tool* *Assessment Framework: Activity Assessment, CONACT* *Standard* *The door frame should be plumb, appropriately secured and cased. The door should operate smoothly and trim products applied according to accepted trade practices* *Performance rating of 3 for each applicable task*	70

MODULE CON3060: DOORS & TRIM (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• create a profile of a trade or occupation within the finish carpentry field	• presentation of an occupational profile that includes: – a description of the trade or occupation – training requirements – opportunities for career advancement and self-employment. *Assessment Tool* *Research Process: Installing Interior Doors and Trim, CON3060–1* *Standard* *Performance rating of 3 for each applicable task*	10
• demonstrate basic competencies.	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation • Materials	• list and describe the types of components and moldings that are used in conjunction with the installation and finishing of: – railings – doors – columns – floors and ceiling	
• Door Installation	• describe the different ways doors are constructed • label the parts of a panel door. • describe the common types of joints and methods of measuring and cutting used to install various moldings and casings such as miter, coped and butt joint.	

MODULE CON3060: DOORS & TRIM (continued)

Concept	Specific Learner Expectations	Notes
Planning and Management • Estimating • Prefinishing	*The student should:* • from a set of drawings: – identify the styles of moldings and calculate the amounts to be ordered to finish a wall section complete with door – prefinish moldings and casing where possible.	
Implementation	• use the appropriate tools, materials and processes to: – install prefabricated door or bifold unit – install a lock set – install room moldings and casings.	
Assessment • Career Information • Career Preparation	• identify employment and training opportunities related to finish carpentry • describe personal interests and abilities related to making realistic career choices • maintain a record of completed activities within a portfolio.	

MODULE CON3070: FLOORCOVERING

Level:	Advanced
Theme:	Building Systems (Processes and Applications)
Prerequisite:	CON1070 Building Construction
Module Description:	Students develop skills in selecting and installing typical floor coverings used in residential, institutional and commercial buildings.
Module Parameters:	Access to a building site and/or construction facility and to instruction from an individual with specialized training in floor covering.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• identify and describe common types of residential, institutional and commercial floor coverings	• presentation of a written research project that identifies and describes four major floor types (resilient sheet or tile, wood, ceramic and carpet). *Assessment Tool* *Research Process: Installing Floor Coverings, CON3070–1* *Standard* *Performance rating of 3 for each applicable task*	30
• apply flooring skills to assist in the installation of a floor covering	• demonstration of appropriate skills in the application of one or more flooring materials given an on-site or mock-up project. *Assessment Tool* *Assessment Framework: Activity Assessment, CONACT* *Standard* *Materials have been selected and installed in keeping with the manufacturer's recommendations and accepted trade practice. Joints are tight and patterns are aligned accurately; surfaces are smooth and free from blemishes* *Performance rating of 3 for each applicable task*	60

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• create a profile of a trade or occupation within the floor covering field	• presentation of an occupational report that includes a description of the working conditions, job opportunities and training requirements. *Assessment Tool* *Research Process: Installing Floor Coverings, CON3070–1* *Standard* *Performance rating of 3 for each applicable task*	10
• demonstrate basic competencies.	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation • Floor Covering Materials	• list and describe common types of residential and commercial floor covering materials; e.g.: – resilient (vinyl, rubber, cork) – carpet – ceramic tile – wood • identify the factors that are used to determine the selection of a floor covering • explain how concrete and wood floors differ in the way they are prepared for a floor covering • identify appropriate adhesives and fasteners for a given covering	

MODULE CON3070: FLOORCOVERING (continued)

Concept	Specific Learner Expectations	Notes
• Installation Techniques	*The student should:* • describe the processes used to: – rough fit, seam and stretch a carpet – rough fit and seam a vinyl covering – lay out a floor surface for tile, parquet and wood flooring – nail square edge and tongue-and-groove wood flooring – fill, sand and finish a wood floor – set, grout and seal ceramic tile.	Discuss the issues related to removing an old floor covering and replacing it with a new one.
Planning and Management • Estimating	• describe the appropriate flooring for a given application • calculate the cost of materials and supplies for a given area • measure an area and prepare a layout sketch of starter courses.	If on-site work is unavailable, consider using a mock-up activity.
Implementation • Material Processing	• use the appropriate tools, materials and processes to: – prepare a floor surface – install a floor covering – seal and finish where applicable.	
Assessment • Career Information	• identify the employment and business opportunities related to the manufacture, installation and sale of floor coverings • describe personal interests and abilities related to making realistic career choices	
• Career Preparation	• maintain a record of completed activities within a portfolio.	

MODULE CON3080: ENERGY-EFFICIENT HOUSING

Level: Advanced

Theme: Building Systems (Processes and Applications)

Prerequisite: CON1070 Building Construction

Module Description: Students investigate construction practices and support systems to create an energy-efficient housing design.

Module Parameters: Access to a building site and/or construction facility and to instruction from an individual with specialized training in carpentry.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• identify and describe energy-efficient construction materials and techniques	• a written report that correctly identifies and describes at least five types of energy efficient construction techniques and at least five energy efficient materials used in construction. *Assessment Tool* *Assessment Framework: Presentations/Reports, CTSPRE* *Standard* *Performance rating of 3 for each applicable task*	20
• calculate the energy efficiency of a typical residence or commercial structure	• the use of the appropriate programs to analyze and calculate the energy efficiency of a given house design	30
• write a proposal outlining how to improve the energy efficiency of a given building	• given the energy efficiency of a given building and knowledge of thermal resistance values of building materials, identifying at least five areas where the efficiency of a given building can be improved and the recommended procedures. *Assessment Tool* *Assessment Framework: Research Process, CTSRES* *Standard* *Performance rating of 3 for each applicable task*	50

MODULE CON3080: ENERGY-EFFICIENT HOUSING (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • demonstrate basic competencies.	*Assessment of student achievement should be based on:* • observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation	• identify the factors that have contributed to more energy efficient housing • describe the construction techniques that are used in energy efficient buildings • list and describe the materials that are used to improve the energy efficiency of a building • define the term R factor • describe the ways heat can enter or escape from a building • describe corrective measures that can be undertaken in existing buildings to improve energy efficiency • identify and describe passive and active heating and cooling systems • research the effects of landscaping on the energy efficiency.	
Implementation	• analyze an existing structure to estimate the heat loss through ceilings, walls, doors and windows • prepare a proposal for an existing building outlining the work to be done to improve efficiency and its cost-effectiveness.	If possible, use a computer program to assist with the calculations.

MODULE CON3080: ENERGY-EFFICIENT HOUSING (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Assessment		
- Career Information	- identify the employment and business opportunities related energy efficient research and design	
- Career Preparation	- maintain a record of completed activities within a portfolio.	

MODULE CON3090: RENOVATIONS/RESTORATIONS

Level: Advanced

Theme: Building Systems (Processes and Applications)

Prerequisite: CON1070 Building Construction

Module Description: Students work with a client to plan and complete a building renovation and/or restoration.

Module Parameters: Access to a building site and/or construction facility and to instruction from an individual with formal, specialized training in carpentry.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• **complete a feasibility study and cost estimate of a renovation/ restoration project**	• analysis of an existing building to determine the feasibility and cost of undertaking a given renovation and/or restoration project. *Assessment Tool* *Presentations/Reports: Building Renovation/ Restoration Project, CON3090–1* *Standard* *The study will include an accurate description of the project and structural details, materials list, and time and cost estimate* *Performance rating of 3 for each applicable task*	30
• **apply construction skills to assist in a building renovation/restoration project, using traditional and modern construction materials and techniques**	• demonstration of appropriate planning, management, construction and teamwork skills to complete a building renovation/restoration project. *Assessment Tool* *Assessment Framework: Activity Assessment, CONACT* *Standard* *The renovation/restoration conforms to all local building codes and trade practices as well as meeting the client's expectations* *Performance rating of 3 for each applicable task*	70

MODULE CON3090: RENOVATIONS/RESTORATIONS (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • demonstrate basic competencies.	*Assessment of student achievement should be based on:* • observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation		
• Renovation Practices	• identify the types of renovations that are most commonly carried out such as: – changing or adding windows – creating a new entrance or opening a room – building on an addition – replacing exterior finish • identify what types of renovations require local permits or work that requires special skills and certification • predict, by considering the age of the original building, the types of materials and construction techniques used in the original construction • identify sources of information regarding construction methods and materials used in historical buildings	Besides new construction, students should be aware of the many opportunities for work related to building renovation and restoration.
• Health and Safety	• list the materials that for health reasons require special care when renovating • identify local regulations regarding the disposal of hazardous materials.	Pay special attention to asbestos and lead paint that may have been used in older buildings.

MODULE CON3090: RENOVATIONS/RESTORATIONS (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Planning and Management • Renovation Proposal	• prepare a feasibility study by determining: – usefulness of the renovation – cost of materials and labour – disruption to the use of other living space – structural as well as aesthetic considerations – impact on support systems such as heating, lighting and plumbing • prepare a working drawing of a typical renovation • prepare a work schedule for a typical renovation/restoration project.	Students should be aware that local planning authorities often will have a say in what can or cannot be done to a building particularly if it is considered to be a "Heritage Building."
Implementation • Construction Process	• apply planning, management and construction skills to complete a renovation and/or restoration project.	
Assessment • Career Information	• identify the employment opportunities and the establishment of an entrepreneurial venture associated with renovation work	
• Career Preparation	• maintain a record of completed activities within a portfolio.	

MODULE CON3100: COMMERCIAL STRUCTURES

Level: Advanced

Theme: Building Systems (Processes and Applications)

Prerequisite: CON1070 Building Construction

Module Description: Students investigate structural designs, construction techniques and work-site practices related to commercial construction.

Module Parameters: Access to a commercial construction site and/or construction facility and to instruction from an individual with formal, specialized training in carpentry.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• compare the differences between residential, institutional and commercial construction	• presentation of a written report that compares residential, institutional and commercial construction on the basis of: – the intended use – the nature of specifications and codes – types of foundations and superstructures – job site organization – specialized skills and trade requirements. *Assessment Tool* *Assessment Framework: Presentations/Reports, CTSPRE* *Standard* *Performance rating of 3 for each applicable task*	20
• describe common types of materials and construction techniques used in commercial construction	• incorporation of common materials and construction techniques used in a model or in photographs and diagrams of a commercial/institutional construction project. *Assessment Tool* *Assessment Framework: Activity Assessment, CONACT* *Standard* *The model should be as realistic as possible and should maintain a set scale throughout. Photographs should show essential design features and structural materials and components* *Performance rating of 3 for each applicable task*	40

MODULE CON3100: COMMERCIAL STRUCTURES (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• demonstrate commercial construction job site expectations and skill requirements	• correct usage of appropriate rigging techniques and personal protective equipment. *Standard* *All procedures are performed according to accepted practices*	40
• demonstrate basic competencies.	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation		
• Foundations and Structural Systems	• identify the major differences between a residential and commercial/institutional construction project • describe the techniques used to build a shallow and deep foundation for commercial/institutional buildings • describe the various floor systems and components that are used in commercial/institutional construction • compare structural steel framing techniques with those of reinforced concrete framing	Highlight different uses, construction techniques, building codes and working conditions.
• Walls and Surfaces	• explain the advantage of using curtain walls in highrise buildings • describe typical methods of installing utilities in commercial buildings • identify common methods of finishing exterior and interior surfaces	Students should be encouraged to visit a construction site and interview the workers.

MODULE CON3100: COMMERCIAL STRUCTURES (continued)

Concept	Specific Learner Expectations	Notes
• Worker Safety	*The student should:* • identify the personal protective equipment that is required on the job site • demonstrate the basic lift signals used on the construction site • identify typical rigging techniques that are used to transport materials • define the term safe working load • describe correct methods of installing and securing scaffolding • describe the role of a safety supervisor on a job site.	Demonstrate the proper use of ropes, chains and cables as well as shackles, hooks and knots.
Planning and Management	• describe worker expectations on a typical job site • list and describe the personal protective equipment required on a job site.	
Implementation	• demonstrate the proper use of: – slings and hitches – knots – hand signals • produce a scale model or illustrated log that features common materials and techniques used in commercial/residential construction.	
Assessment • Career Information • Career Preparation	• identify the working conditions, employment and training opportunities related to heavy construction • maintain a record of completed activities within a portfolio.	

MODULE CON3110: SITE MANAGEMENT

Level: Advanced

Theme: Building Systems (Processes and Applications)

Prerequisite: CON1070 Building Construction

Module Description: Students consider the efficient and timely delivery of a quality product. They investigate and report on site management theories and practices to produce a project management plan.

Module Parameters: Access to appropriate in-school and community resources.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• identify and describe the key elements of project management related to commercial and residential construction	• identification and description of the major components and phases of project management plan	30
• outline the roles and responsibilities of the principal players on a construction project	• accurate description of the roles and responsibilities of a project manager in relation to one or more key players found on a construction site	35
• apply site management theories and practices to create a management plan for a construction project	• development of a real or simulated management plan for a simple residential or light commercial project. *Assessment Tool* *Research Process, Management Principles and Practices, CON3110–1* *Standard* *Performance rating of 3*	35

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • **demonstrate basic competencies.**	*Assessment of student achievement should be based on:* • observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation		
• Management Phases	• identify the key elements of project management; e.g.: – planning – scheduling – implementing – controlling	Have student understand that project management is the effective and efficient use of human and material resources.
• Planning	• describe the roles and responsibilities of the project manager in relation to: – reviewing contractual agreements and deliverables – establishing effective lines of communication with: • client • suppliers • contractors • inspectors – determining site conditions and amenities; electrical, plumbing and gas supplies	Discuss the importance of knowing the client's needs and being able to convey these to other players to avoid potential problems.
• Scheduling	• compare the advantages and disadvantages of using the critical path and bar chart methods for scheduling a project	If possible, use a computer program to plan a work schedule.
	• identify strategies to help bring a project back on schedule	Discuss the use of contingency time and running jobs in parallel.
	• describe the need for good communication and cooperation between various trades and occupations on a construction site	

MODULE CON3110: SITE MANAGEMENT (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
• Implementing	• identify the primary tasks of completing a project in relation to: – managing supplies – managing contractors – arranging inspections – communicating with the client – keeping records	Lines of communication must be kept open between the key players. Records should also be kept to document work in progress and work that has been completed.
• Controlling	• research procedures to control: – safety on the work site – quality of work – removal and disposal of materials – project costs.	Remind students that project managers must be aware of the personal health and safety as well as environmental issues related to new and renovated structures.
Implementation		
• Planning	• develop a work plan for a given project by determining: – what is to be done – how it will be done – who will do it – when it should be done	
• Scheduling	• schedule the work using a bar chart or critical path technique	If possible, have students use a computer program to develop a work schedule.
• Worker Roles and Relationships	• report on the roles and responsibilities for one or more of the following job site positions: – site superintendent – safety supervisor – subtrade contractor – foreman – skilled worker.	
Assessment		
• Quality Control	• analyze a project and identify procedures to improve: – time management – quality of work – health and safety – cost-efficiencies	

Concept	Specific Learner Expectations	Notes
	The student should:	
• Career Information	• identify the employment and business opportunities related to site management	
• Career Preparation	• maintain a record of completed activities within a portfolio.	

MODULE CON3120: TOOL MAINTENANCE

Level: Advanced

Theme: Manufacturing Systems (Processes and Applications)

Prerequisite: CON1010 Basic Tools & Materials

Module Description: Students develop skills in preventive maintenance by routinely inspecting and servicing production tools and equipment.

Module Parameters: Access to a materials and/or construction facility and to instruction from an individual with specialized training in hand and power tool maintenance.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• identify and describe the essential elements and desired outcomes of a preventive maintenance program	• research project that correctly identifies and describes at least five positive outcomes of a preventive maintenance program	20
• prepare a maintenance schedule for a piece of equipment	• development of a maintenance chart for a given power tool that identifies components and frequency of the service requirements. *Assessment Tool* *Assessment Framework: Research Process, CTSRES* *Standard* *Performance rating of 3 for each applicable task*	20
• apply established maintenance procedures to assess and maintain hand and power tools	• ongoing student involvement in the assessment and maintenance of hand and power tools. *Assessment Tool* *Assessment Framework: Activity Assessment, CONACT* *Standard* *Tools are maintained according to accepted practice and the manufacturer's recommendations* *Performance rating of 3 for each applicable task*	60

MODULE CON3120: TOOL MAINTENANCE (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • demonstrate basic competencies.	*Assessment of student achievement should be based on:* • observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation • Preventive Maintenance Components	• explain reasons for establishing a preventive maintenance program • identify the essential elements of a preventive maintenance program; e.g.: – scheduling and performing periodic maintenance functions – repairing faulty equipment – keeping records of service and maintenance work – tagging or removing equipment that is out of order • show a list of parameters for setting up a maintenance schedule; e.g.: – age of equipment – frequency of use – manufacturer's recommendations – past performance	This module provides opportunity for senior students to become skilled in machine tool maintenance.
• Tool Maintenance	• identify recommended grinding and honing angles for: – plane irons – wood chisels – wood turning tools • calculate twist drill point angles and lip clearances for drilling metals and plastics	Demonstrate proper sharpening techniques for common edge cutting tools.

MODULE CON3120: TOOL MAINTENANCE (continued)

Concept	Specific Learner Expectations	Notes
• Equipment Maintenance	*The student should:* • list and describe the types of adjustments and service requirements of a: – table saw – band saw – scroll saw – jointer – surface planer – portable equipment – drill press – etc. • identify tools that require safety accessories such as a push stick.	Demonstrate appropriate methods to remove and install saw blades, cutting knives, sanding discs and belts.
Planning and Management • Service Scheduling	• prepare a service schedule for a number of production tools and pieces of equipment • design a safety accessory for a specific tool.	Explain how machining flaws such as burns, skips or snips are a result of dull edges or improperly adjusted equipment.
Implementation • Service and Maintenance	• demonstrate a routine inspection of lab tools and equipment • perform maintenance services as required • build a safety accessory.	Have students consider making a fixed or adjustable taper jig, push block or other safety accessory.
Assessment • Career Information • Career Preparation	• identify occupation and trade qualifications related to tool and machine maintenance • maintain a record of completed activities within a portfolio.	

MODULE CON3130: **FURNITURE MAKING 3 (LEG & RAIL)**

Level: Advanced

Theme: Manufacturing Systems (Processes and Applications)

Prerequisite: CON1120 Project Management

Module Description: Students use solid and/or manufactured materials and leg-and-rail or pedestal construction techniques to build a free-standing piece of furniture.

Module Parameters: Access to a materials and/or construction facility and to instruction from an individual with formal, specialized training in furniture and cabinetmaking.

Supporting Modules: CON2130 Furniture Making 1 (Box Construction)
CON2140 Furniture Making 2 (Frame & Panel)

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• identify and describe the design features and joinery techniques of a typical leg-and-rail piece of furniture	• analysis of a working drawing to determine the construction details of a leg-and-rail or pedestal piece of furniture	10
• apply drawing and estimating skills and techniques to prepare a shop drawing, detailed material list and cost estimate	• application of technical drawing and estimating skills to make an accurate material list and cost estimate	20
• plan and build a piece of furniture, using leg-and-rail construction techniques	• application of advanced joinery and finishing skills and techniques used to make a leg-and-rail or pedestal product. *Assessment Tool* *Project Assessment: Leg-and-Rail Construction, CON3130–1* *Standard* *The finished product will be constructed using the appropriate materials, joinery and finishing techniques. Joints are to be flush, tight fitting and square; finished surfaces are to be smooth and free from production defects. Overall dimensions should be within ± 2 mm* *Performance rating of 3 for each applicable task*	70

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MODULE CON3130: FURNITURE MAKING 3 (LEG & RAIL) (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • demonstrate basic competencies.	*Assessment of student achievement should be based on:* • observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation		
• Leg-and-Rail Construction	• describe typical design and joinery techniques used in leg-and-rail and pedestal construction • identify common methods and fastening systems to secure a wood top to an under-frame; e.g.: – wood buttons – metal plates – pocket drilling – blocks	Discuss the issue of form and function when investigating various leg-and-rail and/or pedestal design.
• Table Construction	• describe common methods of transferring a pattern to a work piece such as a table leg or pedestal • describe an appropriate method to reed and flute a surface.	

Concept	Specific Learner Expectations	Notes
	The student should:	
Planning and Management • Product Design	• select a product that requires the use of: – leg-and-rail or pedestal components – solid woods and/or composite materials	
• Work Scheduling and Estimating	• interpret a working drawing to prepare a detailed material list and event schedule • design and build the required jigs and templates.	
Implementation • Material Processing	• use the appropriate tools, material and processes to: – measure and lay out stock – cut and shape components – machine appropriate joints – assemble with suitable fasteners – prepare for finishing.	The project may be finished in conjunction with CON2150: Finishing & Refinishing.
Assessment • Career Information	• identify the further educational and skill-building opportunities related to custom furniture making	
• Career Preparation	• maintain a record of completed activities within a portfolio.	

MODULE CON3140: FURNITURE MAKING 4 (SURFACE ENHANCEMENT)

Level: Advanced

Theme: Manufacturing Systems (Processes and Applications)

Prerequisite: CON1120 Project Management

Module Description: Students explore and demonstrate the use of veneer, inlay, carving and/or marquetry techniques to enhance the appearance of a product or component.

Module Parameters: Access to a materials and/or construction facility and to instruction from an individual with formal, specialized training in furniture and cabinetmaking.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• identify and describe methods of matching wood veneer	• a written response that correctly identifies and describes at least four methods of matching wood veneer	15
• differentiate between inlay, marquetry and carving techniques	• a written response that correctly identifies the differences between inlay, marquetry and carving techniques. *Assessment Tool* *Response Assessment: Surface Enhancements, CON3140–1* *Standard* *Performance rating of 3 for each applicable task*	15
• create a veneer, inlay or carving feature for a product or component	• application of veneering/inlaying or carving skills and techniques on a component or a product. *Assessment Tool* *Assessment Framework: Project Assessment, CONPRO* *Standard* *The enhancement will be tight fitting, appropriately matched and detailed using materials that add to the overall appearance and value of the product* *Performance rating of 3 for each applicable task*	70

MODULE CON3140: FURNITURE MAKING 4 (SURFACE ENHANCEMENT) (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • demonstrate basic competencies.	*Assessment of student achievement should be based on:* • observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation • Veneering	• describe the principal methods used to produce a wood veneer; e.g.: – rotary cutting – flat or plain slicing – quarter slicing – right and half round cutting	
	• identify the methods used to match veneer such as: – slip – diamond – checkerboard – book	
	• describe successful cutting and applying techniques	Discuss the advantages and disadvantages of using different core materials and adhesives.
• Marquetry and Inlaying	• differentiate between marquetry and inlaying	
• Carving	• explain how hand and machine carving differ.	

MODULE CON3140: FURNITURE MAKING 4 (SURFACE ENHANCEMENT) (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Planning and Management		
• Product Selection	• identify a product or component that: – requires veneering – is enhanced by a carved, inlaid or marquetry feature	
• Design	• select an appropriate veneer • sketch the desired veneer match • sketch a design for a carved, inlaid or marquetry feature.	
Implementation	• use appropriate tools, materials and processes to: – cut and fit the veneer – apply and glue a veneer – create an inlay, marquetry or carving feature.	
Assessment		
• Career Information	• identify the employment and business opportunities related to advanced furniture making	
• Career Preparation	• maintain a record of completed activities within a portfolio.	

MODULE CON3150: FURNITURE REPAIR

Level: Advanced

Theme: Manufacturing Systems (Processes and Applications)

Prerequisite: CON1120 Project Management

Module Description: Students apply basic knowledge of furniture construction and materials to repair or replace existing components or coverings.

Module Parameters: Access to a materials and/or construction facility and to instruction from an individual with formal, specialized training in carpentry/cabinetry.

Supporting Modules: CON2150 Finishing & Refinishing
FAS2150 Upholstery [Fashion Studies Strand]

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• assess the condition of a piece of furniture to determine whether it can be economically repaired or restored	• the analysis of an existing piece of furniture to determine the feasibility of repairing or restoring the product	20
• prepare a repair/ restoration plan and cost estimate	• the development of a repair/restoration plan and estimate for a given piece of furniture or millwork	15
• repair/restore a piece of furniture	• the application of repair and restoration skills. *Assessment Tool* *Project Assessment: Repairing/Restoring Furniture, CON3150–1* *Standard* *The integrity and usefulness of the product have been maintained while meeting the clients needs and expectations* *Performance rating of 3 for each applicable task*	65

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MODULE CON3150: FURNITURE REPAIR (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • demonstrate basic competencies.	*Assessment of student achievement should be based on:* • observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation		
• Furniture Appraisal	• identify the factors that determine whether a piece of furniture is worth repairing or restoring	Encourage students to establish the restored and unrestored value of a piece of furniture before work begins.
• Repair and Restoration Techniques	• describe safe and efficient methods to: – loosen old glue and clean joints – remove and replace dowel pins – tighten loose joints – patch or repair a veneer surface – splice a component – repair and/or replace a plastic molding	Discuss the use of common adhesives such as: • animal • casein • white liquid resin • yellow resin glue • epoxy cement • contact cement • heat activated glue.
	• identify practical methods to determine the nature of the original structural materials and finishes • identify the design features that might have caused a component to fail	Associating failures with a specific design will help students design features better products in the future.
• Health and Safety	• describe the hazards associated with stripping old paint, varnish and lacquer finishes.	

MODULE CON3150: FURNITURE REPAIR (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Planning and Management		
• Feasibility Study	• describe the overall condition and feasibility of restoring a given piece of furniture	
• Estimating	• estimate the time, supply and material cost to: – disassemble – strip down – repair – reassemble – refinish.	
Implementation	• use the appropriate tools, materials and processes to repair and restore a piece of furniture.	
Assessment		
• Career Information	• research employment and business opportunities pertaining to furniture repair and restoration	
• Career Preparation	• maintain a record of completed activities within a portfolio.	

MODULE CON3160: CABINETMAKING 3 (CABINETS/COUNTERTOPS)

Level: Advanced

Theme: Manufacturing Systems (Processes and Applications)

Prerequisite: CON1120 Project Management

Module Description: Students develop the knowledge and skills required to build and install a simple cabinet/countertop complete with an appropriate backsplash and edge treatment.

Module Parameters: Access to a materials and/or construction facility and to instruction from an individual with formal, specialized training in carpentry/cabinetry.

Supporting Module: CON1160 Manufactured Materials

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• identify and describe common types of cabinets/countertops and installation procedures	• the presentation of a written report that demonstrates knowledge of: – types of countertops currently used in cabinet production – ways in which edges may be concealed to produce an esthetically pleasing product – common methods of countertop installation with particular emphasis on fastener concealment. *Assessment Tool* *Assessment Framework: Presentations/Reports, CTSPRE* *Standard* *Performance rating of 3 for each applicable task*	15
• identify and describe a suitable edge treatment for a given application	• development of a mock-up or sample display of at least two different edge treatments. *Assessment Tool* *Assessment Framework: Activity Assessment, CONACT* *Standard* *Samples should be securely bonded. Edges should be flush and free of sharp corners or chips and traces of cement* *Performance rating of 3 for each applicable task*	15

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Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• apply/install a given material to produce a suitable cabinet/ countertop	• construction and installation of a cabinet/countertop for a given application. *Assessment Tool* *Assessment Framework: Activity Assessment, CONACT* *Standard* *The cabinet/countertop dimensions should be accurate to within 1 mm of the specifications and the finished product should be completely free of finish blemishes. An accepted and appropriate edge treatment should be employed, and any fasteners used in its application should be concealed* *Performance rating of 3*	70
• demonstrate basic competencies.	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation • Types of Materials	• identify common countertop materials: – ceramic tile – plastic laminate – natural and synthetic marble – molded laminates • identify typical methods and materials used to seal components	

Concept	Specific Learner Expectations	Notes
	The student should:	
- Application Techniques	- describe the processes used to: – apply ceramic tile – apply plastic laminates – install manufactured tops - identify and describe typical edge treatments used with a given cabinet/countertop material - describe standard procedures to: – cut and trim plastic laminates – cut ceramic tile.	
Health and Safety	- list and demonstrate the safe use of power tools used to install cabinet/countertop materials - describe the health and safety issues that pertain to the use of specific solvents and adhesives.	
Planning and Management		The skills in this module can be assessed on a full-size project or on a mock-up.
- Material Selection	- select the appropriate material and edge treatment for a given application	
- Work Scheduling	- prepare a detailed material and procedural list - identify and note the location of fixtures.	
Implementation		
- Material Processing	- use the appropriate tools, materials and processes to: – measure and mark stock – cut and fit materials – attach component – apply materials and edge treatment – locate and prepare openings for fixtures – clean and seal.	Stress the importance of using personal protective equipment, particularly related to tile cutting and use of power tools.

Concept	Specific Learner Expectations	Notes
	The student should:	
Assessment		
• Career Information	• identify the employment and business opportunities related to the installation of cabinet/countertops	
• Career Preparation	• maintain a record of completed activities within a portfolio.	

MODULE CON3170: CABINETMAKING 4 (LAYOUT & INSTALLATION)

Level: Advanced

Theme: Manufacturing Systems (Processes and Applications)

Prerequisite: CON1120 Project Management

Module Description: Students develop a floor/wall cabinet plan and order and install a set of prebuilt cabinets.

Module Parameters: Access to a building site and/or construction facility and to instruction from an individual with formal, specialized training in carpentry/cabinetry.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• design a room layout and prepare a cabinet schedule	• the development of a scale drawing in plan view, accompanied by preliminary sketches and a complete cabinet schedule. *Assessment Tool* *Assessment Framework: Activity Assessment, CONACT* *Standard* *The layout should conform to the principles of the work triangle and meet current standards for depth, height and distances between upper and lower cabinets and allowances for appliances. The cabinet schedule should be fully detailed and contain accurate measurements. A master layout or story pole should accompany the drawing* *Performance rating of 3 for each applicable task*	20
• lay out and install a set of cabinets and countertops	• the installation of a set of cabinets and countertop is in a mock-up or actual job site situation. *Assessment Tool* *Assessment Framework: Activity Assessment, CONACT* *Standard* *Components are positioned according to the layout drawing, levelled and securely fastened. Components, fillers and countertops are scribe fit where needed. Doors and drawers are aligned and tested* *Performance rating of 3 for each applicable task*	65

MODULE CON3170: CABINETMAKING 4 (LAYOUT & INSTALLATION) (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• create a profile of a trade or occupation within the cabinetmaking field	• presentation of an occupation profile that outlines: – employment opportunities – training and entry requirements – working conditions. *Assessment Tool* *Assessment Framework: Research Process, CTSRES* *Standard* *Performance rating of 3 for each applicable task*	15
• demonstrate basic competencies.	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation	• identify and describe the principles of various kitchen, bathroom and workroom layouts • describe the procedures used to level a set of cabinets • describe the techniques and fasteners used to attach cabinets together, to the floor, ceiling and wall structures.	Discuss the principle of the work triangle in kitchen or other work space.

Concept	Specific Learner Expectations	Notes
	The student should:	
Planning and Management	• use a set of drawings and specifications to determine the size, location and type of modular units • prepare a story pole or master layout on plywood or cardboard for a specified section of a cabinet installation • check and note irregularities in walls and floors • identify cabinet modifications owing to irregularities and service outlets.	Use a CAD system if possible.
Implementation	• use the appropriate tools, materials and processes to: – locate and level units – assemble and install units – install countertops – apply fillers and moldings – adjust fit of doors and drawers.	Besides a regular kitchen, consider a child's play kitchen as a possible project.
Assessment • Career Information	• identify employment opportunities related to: – kitchen and bathroom design – cabinet manufacturing – installing cabinets • describe personal interests and abilities related to making realistic career choices	
• Career Preparation	• maintain a record of completed activities within a portfolio.	

MODULE CON3190: PRODUCTION PLANNING

Level: Advanced

Theme: Manufacturing Systems (Processes and Applications)

Prerequisite: CON2200 Product Development

Module Description: Students plan, individually or as team members, a production system, and create the necessary work cells and floor plan to produce a given product in a safe and efficient manner.

Module Parameters: Access to a building site and/or construction facility and to instruction from an individual with specialized training in production work.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• identify the characteristics of an efficient production system	• presentation of a written report that outlines the elements that contribute to the development of an efficient production system	15
• analyze a product to determine the necessary production processes and tools	• analysis of a given product to determine the tools, materials and processes to create a production flow chart and locate the required jigs, fixtures and tools.	70
• create a production flow chart and/or facility layout	*Assessment Tool* *Presentations/Reports: Planning for Efficiency, CON3190–1* *Standard* *Performance rating of 3 for each applicable task*	15
• demonstrate basic competencies.	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation		
• Production Methods	• describe the factors that determine whether a product part or component will be built or purchased	It may be more economical to purchase a part than to make it.
	• describe the production methods that are used to separate, combine and form materials	
	• describe common methods of material and product handling	Consider ways to avoid "bottlenecks" and back-tracking.
	• identify the conditions that contribute to a efficient production system; e.g.: – use of flexible equipment – zero tolerance – multi-skilled work teams – authority delegated to the workers	Discuss the move back to building a complete product using a team approach rather than using mass production techniques.
	• identify methods to control: – inventory – production – quality	
• Health and Safety	• list and describe typical safety regulations that govern: – space between equipment – type of floor surfaces – amount of light – air quality control.	
Planning and Management	• break a given product down into its separate parts and identify how each part can be fabricated • show a flow chart for the movement of materials and products • train personnel for specific tasks.	
Implementation	• design and build the necessary jigs, fixtures and templates for a given part and process • organize the required equipment to create a required work cell or shop layout.	

MODULE CON3190: PRODUCTION PLANNING (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Assessment		
- Quality Control	- test and improve the production processes if necessary	
- Career Preparation	- maintain a record of completed activities within a portfolio.	

MODULE CON3200: PRODUCTION MANAGEMENT

Level: Advanced

Theme: Manufacturing Systems (Processes and Applications)

Prerequisite: CON3190 Production Planning

Module Description: Students identify and enhance management skills in relation to the development and deployment of people and physical resources.

Module Parameters: Access to a materials and/or construction facility and to instruction from an individual with specialized training in production work.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• describe effective production management strategies	• presentation of a written report that outlines the role of management in relationship to planning, organizing and allocating resources	35
• develop a system to manage and schedule work and to control materials and completed products	• describes a system to schedule work, order and inventory materials and track completed products	
• use effective management skills to operate an efficient production system	• implementation of a management plan to produce a given product. *Assessment Tool* *Presentations/Reports: Quality Management, CON3200–1* *Standard* *Performance rating of 3 for each applicable task*	65
• demonstrate basic competencies.	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

MODULE CON3200: PRODUCTION MANAGEMENT (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation • Role of Management	• define the role of management in a production system • identify and describe the key management elements; e.g.: – planning – organizing – leading – controlling • identify the functions that are the responsibility of a management team; e.g.: – marketing – research and development – production – servicing – finance – training.	Students should be asked to participate in management activities as well as in production. Discuss total quality management principles.
Management Techniques	• identify and describe typical scheduling techniques used by production managers such as a PERT chart (Program Evaluation Review Technique) • differentiate between quality control and total quality management • compare labour–management relations in a traditional and automated settings • describe the role government has in overseeing production such as: – Occupational Health and Safety – Workers' Compensation – Alberta Environmental Protection.	
Implementation • Scheduling	• prepare a PERT chart or other scheduling device for a production project	

MODULE CON3200: PRODUCTION MANAGEMENT (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
• Business Plan	• produce a simple business plan by outlining its purpose, performing a cash flow analysis and predicting its profitability	
• Working Conditions and Relations	• plan, implement and monitor a safety program for a production project OR • create a system to improve working conditions and job satisfaction.	
Assessment		
• Career Information	• describe the career preparation and management opportunities related to a production industry	
• Career Preparation	• maintain a record of completed activities within a portfolio.	

MODULE CON3210: FRAMING SYSTEMS 2 (FLOOR, WALL & CEILING)

Level: Advanced

Theme: Building Systems (Processes and Applications)

Prerequisite: CON2040 Framing Systems 1 (Floor & Wall)

Module Description: Students develop appropriate layout and assembly skills to install conventional and/or engineered framing components associated with residential and/or light commercial construction.

Module Parameters: Access to a building site and/or construction facility and to instruction from an individual with formal, specialized training in carpentry.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• compare conventional and engineered framing systems and components	• a written or oral response that describes and compares the components and procedures used to construct a floor, wall and ceiling frame and support system using conventional lumber and engineered components. *Assessment Tool* *Response Assessment: Framing Systems, CON3210–1* *Standard* *Response rating of 3*	20
• apply print-reading and estimating principles to prepare a material list and cost estimate for a structure that incorporates conventional and/or engineered framing components	• preparation of a framing plan, material list and cost estimate given a typical residential or light commercial drawing and span tables	15
• demonstrate advanced framing, layout and assembly skills	• observation of framing skills through on-site and/or in-shop work. *Assessment Tool* *Construction Activity: Framing, CON3210–2* *Standard* *Performance rating of 3 for each applicable task*	65

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MODULE CON3210: FRAMING SYSTEMS 2 (FLOOR, WALL & CEILING) (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • demonstrate basic competencies.	*Assessment of student assessment should be based on:* • observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation		
• Floor Support Systems	• describe the parts of a typical residential floor and wall frame and support system • identify and describe two common types of posts used in floor framing support systems • compare the advantages and disadvantages of: – built-up beams – solid timber beams – laminated beams – steel beams	Discuss the effects that live and dead loads, lateral pressure and intermittent loads have on the design of a structure. Explain how to construct a built-up beam to meet Alberta Building Code requirements.
• Framing Systems	• compare the advantages and disadvantages of using: – conventional framing materials – truss joists – wooden I-beams – metal joists/studs • identify and describe typical procedures that are used to join floor joists to a foundation or wall section	Explain how joists can be embedded, accommodate a brick finish or be attached to a sill plate.

MODULE CON3210: FRAMING SYSTEMS 2 (FLOOR, WALL & CEILING) (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Orientation		
• Framing Systems (continued)	• compare different methods used to attach floor joists to steel and built-up beams • identify typical framing procedures used in relation to: – load and non-load bearing partitions – stair, chimney and stack openings – parallel and 90° cantilevers	Discuss the use of joist hangers and ledger boards.
• Floor and Wall Restraining, Notching and Drilling	• identify and describe common methods of bridging floors and bracing walls: – cross-bridging – continuous wood strapping – solid blocking – continuous steel strapping • identify code requirements related to notching and drilling floor joists and wall studs	
• Floor and Wall Sheathing	• identify common types of sub-flooring materials, underlayments and wall sheathing • identify the purpose and types of connectors/ties and adhesives that are used in conjunction with the application of flooring and sheathing components	Discuss code requirements for installing a sub-floor and wall covering.
• Health and Safety Issues	• identify appropriate methods to cover floor/wall openings and construct temporary railings to code • describe safe operation of portable electric and air activated hand tools • identify appropriate personal protective equipment used on the job site.	

MODULE CON3210: FRAMING SYSTEMS 2 (FLOOR, WALL & CEILING) (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Planning and Management		
• Estimating	• use the appropriate tables to determine the clear spans, actual lengths of joists/headers for a variety of framing materials and applications • estimate the size and quantities of materials required to construct a floor/wall/ceiling system.	Engineered components should be sized to eliminate waste.
Implementation		
• Construction Techniques	• develop skills in relation to: – built up beam and header construction and installation – cutting, layout and installation and sheathing of floor, wall and ceiling components – squaring and applying sub-floor materials – framing walls and ceiling	Stress the importance of following appropriate squaring and plumbing techniques.
• Health and Safety	• demonstrate proper lifting techniques • use proper personal protective equipment • demonstrate appropriate temporary bracing techniques • demonstrate proper care and use of hand and power assisted tools • secure all floor, wall and ceiling openings.	Check condition of ladders and ensure safe angle ratios.
Assessment		
• Quality Control	• check alignment of crowns and bridging systems as well as the application of fasteners and adhesives	
• Career Information	• identify further training and career opportunities related to the manufacture and installation of conventional and engineered components	
• Career Preparation	• maintain a record of completed activities within a portfolio.	

CONSTRUCTION TECHNOLOGIES

SECTION G: ASSESSMENT TOOLS

The following pages comprise background information and strategies for assessing student achievement and the assessment tools that are listed in Sections D, E and F of this Guide.

This section of the Guide to Standards and Implementation has been designed to provide a common base of understanding about the level of competencies students are expected to demonstrate to successfully complete a module. The goal is to establish assessment standards for junior and senior high school students that are fair, credible and challenging.

These tools will assist teachers throughout the province to more consistently assess student achievement. The purpose of expanding on the assessment standards is to:

- increase confidence among students, parents, business/industry and post-secondary that students can demonstrate the competencies specified in the modules they have completed
- encourage fairness and equity in how students' efforts are judged
- enable learners to focus effort on key learnings
- support teachers and community partners in planning and implementing CTS.

These tools were validated during the optional stage of CTS implementation.

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ASSESSING STUDENT ACHIEVEMENT IN CTS

The CTS assessment standards assess two basic forms of competency:

- What can a student ***do***?
  - **make** a product (e.g., wood bowl, report, garment)
  - **demonstrate** a process
    - strand-related competencies (e.g., keyboarding, hair cutting, sewing techniques, lab procedures)
    - basic competencies (e.g., resource use, safety procedures, teamwork).
- What does a student ***know***?
  - knowledge base needed to demonstrate a competency (link theory and practice).

CTS Defines *Summative* Assessment Standards

The assessment standards and tools defined for the CTS modules, referenced in Sections D, E and F of this Guide, focus on the final (or summative) assessment of student achievement.

Assessment throughout the learning period (formative assessment) will continue to assess how students are progressing. Teachers direct and respond to students' efforts to learn—setting and marking tasks and assignments, indicating where improvement is needed, sending out interim reports, congratulating excellence, etc.

Teachers will decide which instructional and assessment strategies to apply during the formative learning period. As formative and summative assessment are closely linked, some teachers may wish to modify the tools included in this section to use during the instructional process. Teachers may also develop their own summative assessment tools as long as the standards are consistent with the minimum expectations outlined by Alberta Education.

Grading and Reporting Student Achievement

When a student can demonstrate ALL of the exit-level competencies defined for the module (module learner expectations), the teacher will designate the module as "successfully completed." The teacher will then use accepted grading practices to determine the percentage grade to be given for the module—a mark not less than 50%.

The time frame a teacher allows a student to develop the exit-level competency is a local decision. NOTE: The Senior High School Handbook specifies that students must have access to 25 hours of instruction for each credit. Students may, however, attain the required competencies in less time and may proceed to other modules.

Teachers are encouraged to consult their colleagues to ensure grading practices are as consistent as possible.

High school teachers may wish to refer to "Directions for Reporting Student Achievement in CTS" for information on how to use the CTS course codes to report the credits that students have earned to Alberta Education. (Copies of this document have been forwarded to superintendents and senior high school principals.)

Components of Assessment Standards in CTS

The following components are included in each module:

- **module learner expectations** (in the shaded left column of the module) define the exit-level competencies students are expected to achieve to complete a module. Each MLE defines and describes critical behaviours that can be measured and observed. The student must meet the standard specified for ALL MLEs within a module to be successful.

- **suggested emphasis** (right column of the module) provides a guideline for the relative significance of each MLE and can be used to organize for instruction.

- **criteria and conditions** (middle column of the module) set the framework for the assessment of student competency, specifying the minimum standard for performance and including a reference to assessment tools, where appropriate.

  Criteria define the behaviours that a student must demonstrate to meet the designated standard. For example, the criteria could describe the various techniques that must be demonstrated when using a tool, and/or describe the minimum components of a project the student must complete.

  Conditions outline the specifications under which a student's competency can be judged. For example, the conditions could specify whether the assessment should be timed or not, or if the student should be allowed to access to support resources or references.

  Standard may be defined by (1) assessment tools, which are referenced in this section (or sometimes in approved learning resources) and/or (2) "illustrative examples" of student work, if appropriate.

  Assessment Tools included in this section of the Guide tend to be of two types:

  - tools generic to a strand or to the entire CTS program; e.g., a standard 5-point rating scale is used in all strands. Other generic tools include assessing reports and presentations and lab safety checklists. (*Names of these tools include the strand code [e.g., "INF" for Information Processing] and a code for the type of tool [e.g., "TDENT" for Text-Data Entry].)*
  - tools specific to a module; e.g., assessment checklist for assessing a venture plan in Enterprise and Innovation or a checklist for sketching, drawing and modelling in Design Studies. *(Names of these tools include the module code; e.g., "INF1010–1" indicating that it is the first module-specific tool used in Information Processing Module 1010.)*

Development and Validation Processes

The "Criteria and Condition" and "Suggested Emphasis" columns have been validated, with extensive input from teachers, professional associations/contacts and post-secondary institutions. The goal is to prepare well-structured assessment standards and related assessment tools that:

- establish an appropriate level of challenge and rigour
- relate directly to the type of learning described in the curriculum standard
- are easy to understand
- are efficient to implement
- can provide a consistent measure of what was expected to be measured.

As students and teachers work with the assessment standards and tools, it is expected that levels of performance will increase as more and more students are able to achieve the minimum standard. Therefore, the assessment standards and related tools will continue to be monitored, and revised as necessary to ensure appropriate levels or rigour and challenge, and successful transitions for students as they leave high school and enter the workplace or related post-secondary programs.

ASSESSING STUDENT ACHIEVEMENT IN CONSTRUCTION TECHNOLOGIES

Much of the assessment in Construction Technologies consists of gathering information about what a student knows and is able to do, and being able to compare those outcomes with the standards identified within the curriculum.

Assessing student performance in Construction Technologies values process as well as product. Its focus is primarily on measuring and reporting on how well a student applies knowledge and skills to complete a given task rather than the simple acquisition of knowledge and skills.

Assessment Strategies and Tools

A variety of tools have been provided for your reference and use. In the development of the assessment materials there has been an attempt to keep it as simple as possible while also providing guidance and assistance to the teacher. The tools are intended to help you assess students' work as accurately and consistently as possible by stating standards of performance for elements felt to be important within the curriculum as a whole or in specific modules. They also provide standards for "basic competencies" students should be able to demonstrate while engaged in learning.

The tools that have been developed are intended to be used as summative assessment tools. Depending on the way the classroom is organized, they may be used when the student has indicated he or she is ready for the final assessment or by the entire class at the end of the learning period.

Tools Generic to Construction Technologies

Throughout the Construction Technologies strand, students are engaged in activities and projects that involve the application of knowledge and use of a variety of skills and techniques. Frameworks for assessing student activities and project work have been developed for each of the introductory, intermediate and advanced levels. These frameworks are identified as *CONACT* and *CONPRO*, respectively.

In addition to "Equipment Checklists" that identify proper set-up, operating and shut-down procedures for specific tools, a "Response Rating Scale" has been developed to help assess the application of knowledge and related content.

Tools Specific to Construction Technologies

The tools that have been developed to assess specific MLEs in a module are labelled with the module number and the tool number; e.g. CON1070–1. They are referred to under the conditions and criteria section for each module.

The assessment tools outline the criteria for assessment and the minimum task performance rating using a five-point scale. These standards establish an appropriate level of performance and achievement for one or more module learner expectations.

A number of module-specific assessment tools have been developed around the frameworks generic to CTS and the strand. These tools identify basic as well as strand-specific skill sets such as:

- Planning and Management
- Information Gathering and Processing
- Presenting/Reporting
- Use of Equipment and Materials
- Construction Techniques.

Where appropriate, "Illustrative Examples" have also been developed to help establish realistic expectations and standards of achievement.

Career exploration is integrated throughout the Construction Technologies strand and is assessed using dedicated tools or as a component of a tool.

BASIC COMPETENCIES REFERENCE GUIDE

The chart below outlines basic competencies that students endeavour to develop and enhance in each of the CTS strands and modules. Students' basic competencies should be assessed through observations involving the student, teacher(s), peers and others as they complete the requirements for each module. In general, there is a progression of task complexity and student initiative as outlined in the Developmental Framework*. **As students progress through Stages 1, 2, 3 and 4 of this reference guide, they build on the competencies gained in earlier stages**. Students leaving high school should set themselves a goal of being able to demonstrate Stage 3 performance.

Suggested strategies for classroom use include:

- having students rate themselves and each other
- using in reflective conversation between teacher and student
- highlighting areas of strength
- tracking growth in various CTS strands
- highlighting areas upon which to focus
- maintaining a student portfolio.

Stage 1— *The student:*	**Stage 2—** *The student:*	**Stage 3—** *The student:*	**Stage 4—** *The student:*
Managing Learning			
☐ comes to class prepared for learning	☐ ——►——►	☐ ——►——►	☐ ——►——►
☐ follows basic instructions, as directed	☐ follows instructions, with limited direction ☐ sets goals and establishes steps to achieve them, with direction	☐ follows detailed instructions on an independent basis ☐ sets clear goals and establishes steps to achieve them	☐ ——►——► ☐ demonstrates self-direction in learning, goal setting and goal achievement
☐ acquires specialized knowledge, skills and attitudes	☐ applies specialized knowledge, skills and attitudes in practical situations	☐ transfers and applies specialized knowledge, skills and attitudes in a variety of situations	☐ transfers and applies learning in new situations; demonstrates commitment to lifelong learning
☐ identifies criteria for evaluating choices and making decisions	☐ identifies and applies a range of effective strategies for solving problems and making decisions	☐ uses a range of critical thinking skills to evaluate situations, solve problems and make decisions	☐ thinks critically and acts logically to evaluate situations, solve problems and make decisions
☐ uses a variety of learning strategies	☐ explores and uses a variety of learning strategies, with limited direction	☐ selects and uses effective learning strategies ☐ cooperates with others in the effective use of learning strategies	☐ ——►——► ☐ provides leadership in the effective use of learning strategies
Managing Resources			
☐ adheres to established timelines; uses time/schedules/planners effectively	☐ creates and adheres to timelines, with limited direction; uses time/schedules/planners effectively	☐ creates and adheres to detailed timelines on an independent basis; prioritizes task; uses time/schedules/planners effectively	☐ creates and adheres to detailed timelines; uses time/schedules/planners effectively; prioritizes tasks on a consistent basis
☐ uses information (material and human resources), as directed	☐ accesses and uses a range of relevant information (material and human resources), with limited direction	☐ accesses a range of information (material and human resources), and recognizes when additional resources are required	☐ uses a wide range of information (material and human resources) in order to support and enhance the basic requirement
☐ uses technology (facilities, equipment, supplies), as directed, to perform a task or provide a service	☐ uses technology (facilities, equipment, supplies), as appropriate, to perform a task or provide a service, with minimal assistance and supervision	☐ selects and uses appropriate technology (facilities, equipment, supplies) to perform a task or provide a service on an independent basis	☐ recognizes the monetary and intrinsic value of managing technology (facilities, equipment, supplies)
☐ maintains, stores and/or disposes of equipment and materials, as directed	☐ maintains, stores and/or disposes of equipment and materials, with limited assistance	☐ maintains, stores and/or disposes of equipment and materials on an independent basis	☐ demonstrates effective techniques for managing facilities, equipment and supplies
Problem Solving and Innovation			
☐ participates in problem solving as a process ☐ learns a range of problem-solving skills and approaches	☐ identifies the problem and selects an appropriate problem-solving approach, responding appropriately to specified goals and constraints	☐ thinks critically and acts logically in the context of problem solving	☐ identifies and resolves problems efficiently and effectively
☐ practices problem-solving skills by responding appropriately to a clearly defined problem, specified goals and constraints, by: – generating alternatives – evaluating alternatives – selecting appropriate alternative(s) – taking action	☐ applies problem-solving skills to a directed or a self-directed activity, by: – generating alternatives – evaluating alternatives – selecting appropriate alternative(s) – taking action	☐ transfers problem-solving skills to real-life situations, by generating new possibilities ☐ prepares implementation plans ☐ recognizes risks	☐ identifies and suggests new ideas to get the job done creatively, by: – combining ideas or information in new ways – making connections among seemingly unrelated ideas – seeking out opportunities in an active manner

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Stage 1— *The student:*	**Stage 2**— *The student:*	**Stage 3**— *The student:*	**Stage 4**— *The student:*
Communicating Effectively			
☐ uses communication skills; e.g., reading, writing, illustrating, speaking	☐ communicates thoughts, feelings and ideas to justify or challenge a position, using written, oral and/or visual means	☐ prepares and effectively presents accurate, concise, written, visual and/or oral reports providing reasoned arguments	☐ negotiates effectively, by working toward an agreement that may involve exchanging specific resources or resolving divergent interests
☐ uses language in appropriate context	☐ uses technical language appropriately	☐ encourages, persuades, convinces or otherwise motivates individuals	☐ negotiates and works toward a consensus
☐ listens to understand and learn	☐ listens and responds to understand and learn	☐ listens and responds to understand, learn and teach	☐ listens and responds to understand, learn, teach and evaluate
☐ demonstrates positive interpersonal skills in selected contexts	☐ demonstrates positive interpersonal skills in many contexts	☐ demonstrates positive interpersonal skills in most contexts	☐ promotes positive interpersonal skills among others
Working with Others			
☐ fulfills responsibility in a group project	☐ →	☐ seeks a team approach, as appropriate, based on group needs and benefits; e.g., idea potential, variety of strengths, sharing of workload	☐ leads, where appropriate, mobilizing the group for high performance
☐ works collaboratively in structured situations with peer members	☐ cooperates to achieve group results	☐ works in a team or group: – encourages and supports team members – helps others in a positive manner – provides leadership/ followership as required – negotiates and works toward consensus as required	☐ understands and works within the context of the group
☐ acknowledges the opinions and contributions of others in the group	☐ maintains a balance between speaking, listening and responding in group discussions ☐ respects the feelings and views of others		☐ prepares, validates and implements plans that reveal new possibilities
Demonstrating Responsibility			
Attendance ☐ demonstrates responsibility in attendance, punctuality and task completion	☐ →	☐ →	☐ →
Safety ☐ follows personal and environmental health and safety procedures	☐ recognizes and follows personal and environmental health and safety procedures	☐ establishes and follows personal and environmental health and safety procedures	☐ transfers and applies personal and environmental health and safety procedures to a variety of environments and situations
☐ identifies immediate hazards and their impact on self, others and the environment	☐ identifies immediate and potential hazards and their impact on self, others and the environment	☐ →	☐ →
☐ follows appropriate/emergency response procedures	☐ →	☐ →	☐ →
			☐ demonstrates accountability for actions taken to address immediate and potential hazards
Ethics ☐ makes personal judgements about whether or not certain behaviours/actions are right or wrong	☐ assesses how personal judgements affect other peer members and/or family; e.g., home and school	☐ assesses the implications of personal/group actions within the broader community; e.g., workplace	☐ analyzes the implications of personal/group actions within the global context
			☐ states and defends a personal code of ethics as required

***Developmental Framework**			
• *Simple task* • *Structured environment* • *Directed learning*	• *Task with limited variables* • *Less structured environment* • *Limited direction*	• *Task with multiple variables* • *Flexible environment* • *Self-directed learning, seeking assistance as required*	• *Complex task* • *Open environment* • *Self-directed/self-motivated*

GENERIC RATING SCALE

SCALE	**RUBRIC STATEMENT** **(included in assessment tool/statements in *italics* are optional)** ***The student*:**	**IS TASK/ PROJECT COMPLETED?**	**PROBLEM SOLVING:** **STUDENT INITIATIVE VS TEACHER DIRECTION/ SUPPORT**	**USE OF TOOLS, MATERIALS, PROCESSES**	***STANDARDS OF QUALITY/ PRODUCTIVITY***	***TEAMWORK LEADERSHIP***	***SERVICE CLIENT/ CUSTOMER***
4	exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals. Analyzes and provides effective client/customer services beyond expectations.*	Exceeds defined outcomes.	Plans and solves problems effectively and creatively in a self-directed manner.	Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.	*Quality, particularly details and finishes, and productivity are consistent and exceed standards.*	*Leads others to contribute team goals.*	*Analyzes and provides effective client/customer services beyond expectations.*
3	meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort. Analyzes and provides effective client/customer services.*	Meets defined outcomes.	Plans and solves problems in a self-directed manner.	Tools, materials and/or processes are selected and used efficiently and effectively.	*Quality and productivity are consistent.*	*Works cooperatively and contributes ideas and suggestions that enhance team effort.*	*Analyzes and provides effective client/customer services.*
2	meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals. Identifies and provides customer/client services.*	Meets defined outcomes.	Plans and solves problems with limited assistance.	Tools, materials and/or processes are selected and used appropriately.	*Quality and productivity are reasonably consistent.*	*Works cooperatively to achieve team goals.*	*Identifies and provides customer/client services.*
1	meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively. Provides a limited range of customer/client services.*	Meets defined outcomes.	Follows a guided plan of action.	A limited range of tools, materials and/or processes are used appropriately.	*Quality and productivity are reasonably consistent.*	*Works cooperatively.*	*Provides a limited range of customer/client services.*
0	has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.	Has not completed defined outcomes.		Tools, materials and/or processes are used inappropriately.			

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ASSESSMENT FRAMEWORK: ISSUE ANALYSIS

CTSISS

INTRODUCTORY	INTERMEDIATE	ADVANCED
The student:	*The student:*	*The student:*
Preparation and Planning • accurately describes an issue on which people disagree • poses an important question regarding the issue • accesses basic in-school/community information sources regarding the issue • uses one or more information gathering techniques	**Preparation and Planning** • accurately describes an issue on which people disagree, explaining areas of disagreement • poses one or more thoughtful questions regarding the issue • accesses a range of relevant in-school/community resources • uses a range of information-gathering techniques	**Preparation and Planning** • accurately describes an issue on which people disagree, explaining specific causes of disagreement • poses thoughtful questions regarding the issue • accesses a range of relevant information sources and recognizes when additional information is required • demonstrates resourcefulness in collecting data
Analyzing Perspectives • clarifies different points of view regarding the issue; *e.g., social, economic, environmental* • states a position on the issue and logical reasons for adopting that position • states an opposing position on the issue and logical reasons for adopting that position • identifies sources of conflict among different positions • distinguishes between fact and fiction/opinion/theory	**Analyzing Perspectives** • categorizes different points of view regarding the issue; *e.g., cultural, ethical, economic, environmental, health-related* • states a position on the issue and logical reasons for adopting that position • states two or more opposing positions on the issue and logical reasons for adopting each position • describes interrelationships among different perspectives/points of view • determines accuracy/currency/reliability of information and ideas	**Analyzing Perspectives** • categorizes different points of view regarding the issue; *e.g., cultural, ethical, economic, environmental, health-related, scientific, political* • states a position on the issue and insightful reasons for adopting that position • states three or more opposing positions on the issue and thoughtful reasons for adopting each position • analyzes interrelationships among different perspectives/points of view • recognizes underlying bias/assumptions/values in information and ideas
Collaboration and Teamwork • shares work appropriately among group members • respects the views of others	**Collaboration and Teamwork** • shares work appropriately among group members • respects and considers the views of others • negotiates solutions to problems	**Collaboration and Teamwork** • shares work appropriately among group members • respects and considers the views of others • negotiates with sensitivity solutions to problems
Evaluating Choices/Making Decisions • identifies useful alternatives regarding the issue • establishes criteria for assessing each alternative; *e.g., social, economic, environmental* • selects an appropriate alternative based on established criteria • reflects on strengths/weaknesses of decisions by considering consequences • communicates information in a logical sequence to justify choices/decisions made	**Evaluating Choices/Making Decisions** • identifies important and appropriate alternatives regarding the issue • establishes knowledge- and value-based criteria for assessing each alternative; *e.g., social, economic, environmental* • selects an appropriate alternative by showing differences among choices • assesses strengths/weaknesses of decisions by considering consequences • communicates ideas in a logical sequence with supporting detail to justify choices/decisions made	**Evaluating Choices/Making Decisions** • describes in detail important and appropriate alternatives regarding the issue • establishes knowledge- and value-based criteria for assessing each alternative; *e.g., social, economic, environmental* • selects an appropriate and useful alternative by showing differences among choices • assesses strengths/weaknesses of decisions by considering consequences and implications • communicates thoughts/feelings/ideas clearly to justify choices/decisions made

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INTRODUCTORY	INTERMEDIATE	ADVANCED
The student:	*The student:*	*The student:*
Management • prepares self for task • organizes and works in an orderly manner • carries out instructions accurately • uses time effectively	**Management** • prepares self for task • organizes and works in an orderly manner • interprets and carries out instructions accurately • plans and uses time effectively • adheres to routine procedures	**Management** • prepares self for task • organizes and works in an orderly manner • interprets and carries out instructions accurately • plans and uses time effectively in a logical sequence • displays leadership in adhering to routine procedures • attempts to solve problems prior to requesting help
Teamwork • cooperates with group members • shares work appropriately among group members	**Teamwork** • cooperates with group members • shares work appropriately among group members • negotiates solutions to problems	**Teamwork** • cooperates with group members • shares work appropriately among group members • negotiates with sensitivity solutions to problems • displays effective communication skills
Use of Equipment and Materials • selects and uses appropriate equipment/materials • follows safe procedures/techniques • weighs and measures accurately • returns clean equipment/materials to storage areas	**Use of Equipment and Materials** • selects and uses appropriate equipment/materials • models safe procedures/techniques • weighs and measures accurately • practises proper sanitation procedures • minimizes waste of materials • advises of potential hazards and necessary repairs	**Use of Equipment and Materials** • selects and uses equipment/materials independently • demonstrates concern for safe procedures/techniques • weighs and measures accurately and efficiently • practises proper sanitation procedures • minimizes waste of materials • anticipates potential hazards and emergency response
Investigative Techniques • gathers and applies information from at least one source • makes predictions that can be tested • sets up and conducts experiments to test a prediction • distinguishes between manipulated/responding variables • obtains results that can be used to determine if some aspect of the prediction is accurate • summarizes important experimental outcomes	**Investigative Techniques** • gathers and applies information from a variety of sources • makes predictions that can be tested • plans, sets up and conducts experiments to test a prediction • identifies and explains manipulated/responding variables • obtains accurate results that confirm/reject the prediction • summarizes and applies experimental outcomes	**Investigative Techniques** • uses relevant information to explain observations • makes predictions that can be tested • plans, sets up and conducts experiments to test a prediction • analyzes relationships among manipulated/responding variables • obtains accurate results that confirm/reject prediction and answer related questions • summarizes, applies and evaluates experimental outcomes

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ASSESSMENT FRAMEWORK: NEGOTIATION AND DEBATE

INTRODUCTORY	INTERMEDIATE	ADVANCED
The student:	*The student:*	*The student:*
Preparation and Planning	**Preparation and Planning**	**Preparation and Planning**
• accurately describes an issue on which people disagree	• accurately describes an issue on which people disagree, explaining areas of disagreement	• accurately describes an issue on which people disagree, explaining specific causes of disagreement
• poses an important question regarding the issue	• poses one or more thoughtful questions regarding the issue	• poses thoughtful questions regarding the issue
• accesses basic in-school/community information sources regarding the issue	• accesses a range of relevant in-school/community resources	• accesses a range of relevant information sources and recognizes when additional information is required
• uses one or more information-gathering techniques	• uses a range of information-gathering techniques	• demonstrates resourcefulness in collecting data
Analyzing Perspectives	**Analyzing Perspectives**	**Analyzing Perspectives**
• states a position on the issue and logical reasons for adopting that position	• states a position on the issue and logical reasons for adopting that position	• states a position on the issue and insightful reasons for adopting that position
• explains why the issue is important by presenting examples of possible consequences	• explains why the issue is important by presenting examples of possible consequences	• explains why the issue is important by presenting examples of possible consequences and implications
• clarifies different points of view regarding the issue; *e.g., social, economic, environmental*	• categorizes different points of view regarding the issue; *e.g., cultural, ethical, economic, environmental, health-related*	• categorizes different points of view regarding the issue; *e.g., cultural, ethical, economic, environmental, health-related, scientific, political*
• distinguishes between fact and fiction/opinion/theory	• determines accuracy/currency/reliability of information and ideas	• recognizes underlying bias/assumptions/values in information and ideas
Collaboration and Teamwork	**Collaboration and Teamwork**	**Collaboration and Teamwork**
• works with a range of peer members	• works with a range of peer members	• works with a wide range of peer members
• shares information/opinions/suggestions through group discussion	• shares information/opinions/suggestions, maintaining a balance between speaking and listening	• shares information/opinions/suggestions, maintaining a balance between speaking and listening
• listens to and respects the views of others	• listens to and respects the views of others, requesting clarification as necessary from other group members	• listens to and respects the views of others, requesting clarification as necessary from other group members
Negotiating and Debating	**Negotiating and Debating**	**Negotiating and Debating**
• presents a convincing argument in logical sequence supporting a position adopted on the issue	• presents a convincing argument in logical sequence supporting a position adopted, conveying points in order of importance	• presents a convincing argument in logical sequence supporting a position adopted, conveying points in order of importance and backing each with sound evidence
• provides a relevant response to opposing arguments	• provides a relevant and convincing response to opposing arguments	• provides a relevant and convincing rebuttal to opposing arguments
• speaks clearly so the argument can be understood	• speaks clearly without hesitation so the argument can be understood	• speaks clearly without hesitation so the argument can be understood by all listeners
• establishes a shared understanding of key alternatives and consequences relevant to the issue	• negotiates a shared agreement on preferred alternatives relevant to the issue	• negotiates a shared agreement on preferred alternatives by resolving divergent points of view

ASSESSMENT FRAMEWORK: PRESENTATIONS/REPORTS

INTRODUCTORY	INTERMEDIATE	ADVANCED
The student:	*The student:*	*The student:*
Preparation and Planning	**Preparation and Planning**	**Preparation and Planning**
• sets goals and follows instructions accurately	• sets goals and describes steps to achieve them	• sets goals and describes steps to achieve them
• responds to directed questions and follows necessary steps to find answers	• uses personal initiative to formulate questions and find answers	• uses personal initiative to formulate questions and find answers
• accesses basic in-school/community information sources	• accesses a range of relevant in-school/community resources	• accesses a range of relevant information sources and recognizes when additional information is required
• interprets and organizes information into a logical sequence	• interprets, organizes and combines information into a logical sequence	• interprets, organizes and combines information in creative and thoughtful ways
• records information accurately, using correct technical terms	• records information accurately with appropriate supporting detail and using correct technical terms	• records information accurately, using appropriate technical terms and supporting detail
• uses time effectively	• plans and uses time effectively	• plans and uses time effectively, prioritizing tasks on a consistent basis
	• gathers and responds to feedback regarding approach to task and project status	• assesses and refines approach to task and project status based on feedback and reflection
Presentation	**Presentation**	**Presentation**
• demonstrates effective use of at least one medium of communication: *e.g.,* Written: *spelling, punctuation, grammar, basic format* Oral: *voice projection, body language* Audio-Visual: *techniques, tools*	• demonstrates effective use of at least two communication media: *e.g.,* Written: *spelling, punctuation, grammar, format (formal/informal)* Oral: *voice projection, body language, appearance* Audio-Visual: *techniques, tools, clarity*	• demonstrates effective use of a variety of communication media: *e.g.,* Written: *spelling, punctuation, grammar, format (formal/informal, technical/literary)* Oral: *voice projection, body language, appearance, enthusiasm, evidence of prior practice* Audio-Visual: *techniques, tools, clarity, speed and pacing*
• uses correct grammatical convention and technical terms through proofreading/editing	• maintains acceptable grammatical and technical standards through proofreading and editing	• maintains acceptable grammatical and technical standards through proofreading and editing
• provides an introduction that describes the purpose of the project	• provides an introduction that describes the purpose and scope of the project	• provides an introduction that describes the purpose and scope of the project
• communicates information in a logical sequence	• communicates ideas into a logical sequence with sufficient supporting detail	• communicates thoughts/feelings/ideas clearly to justify or challenge a position
• states a conclusion based on a summary of facts	• states a conclusion by synthesizing the information gathered	• states a conclusion by analyzing and synthesizing the information gathered
• provides a reference list of three or more basic information sources	• provides a reference list that includes five or more relevant information sources	• gives evidence of adequate research through a reference list including seven or more relevant information sources

INTRODUCTORY	INTERMEDIATE	ADVANCED
The student:	*The student:*	*The student:*
Preparation and Planning • sets goals and follows instructions accurately • adheres to established timelines • responds to directed questions and follows necessary steps to find answers • uses time effectively	**Preparation and Planning** • sets goals and establishes steps to achieve them • creates and adheres to useful timelines • uses personal initiative to formulate questions and find answers • plans and uses time effectively	**Preparation and Planning** • sets clear goals and establishes steps to achieve them • creates and adheres to detailed timelines • uses personal initiative to formulate questions and find answers • plans and uses time effectively, prioritizing tasks on a consistent basis
Information Gathering and Processing • accesses basic in-school/community information sources • uses one or more information-gathering techniques • interprets and organizes information in a logical sequence • records information accurately, using correct technical terms • distinguishes between fact and fiction/opinion/theory • responds to feedback when current approach is not working	**Information Gathering and Processing** • accesses a range of relevant in-school/community resources • uses a range of information-gathering techniques • interprets, organizes and combines information into a logical sequence • records information accurately with appropriate supporting detail and using correct technical terms • determines accuracy/currency/reliability of information sources • gathers and responds to feedback regarding approach to the task	**Information Gathering and Processing** • accesses a range of relevant information sources and recognizes when additional information is required • demonstrates resourcefulness in collecting data • interprets, organizes and combines information in creative and thoughtful ways • records information accurately with appropriate supporting detail and using correct technical terms • recognizes underlying bias/assumptions/values in information sources • assesses and refines approach to the task and project status based on feedback and reflection
Collaboration and Teamwork • cooperates with group members • shares work appropriately among group members	**Collaboration and Teamwork** • cooperates with group members • shares work appropriately among group members • negotiates solutions to problems	**Collaboration and Teamwork** • cooperates with group members • shares work appropriately among group members • negotiates with sensitivity solutions to problems • displays effective communication and leadership skills
Information Sharing • demonstrates effective use of one or more communication media; *e.g., written, oral, audio-visual* • communicates information in a logical sequence • uses correct grammatical convention and technical terms • cites three or more basic information sources	**Information Sharing** • demonstrates effective use of two or more communication media; *e.g., written, oral, audio-visual* • communicates ideas in a logical sequence with sufficient supporting detail • maintains acceptable grammatical and technical standards • cites five or more relevant information sources	**Information Sharing** • demonstrates effective use of a variety of communication media; *e.g., written, oral, audio-visual* • communicates thoughts/feelings/ideas clearly to justify or challenge a position • maintains acceptable grammatical and technical standards • gives evidence of adequate information gathering by citing seven or more relevant information sources

ASSESSMENT FRAMEWORK: ACTIVITY ASSESSMENT CONACT

INTRODUCTORY	INTERMEDIATE	ADVANCED
The student:	*The student:*	*The student:*
Planning and Management • prepares self for task • adheres to routine procedures • follows basic instructions • uses time effectively • asks for help when unsure	**Planning and Management** • prepares self for task • organizes and works in an orderly manner • interprets and carries out instructions accurately • adheres to established timelines • thinks through the problem before asking for help.	**Planning and Management** • prepares for task and develops an effective work plan • interprets and carries out instructions accurately • plans and uses time in a logical sequence • displays leadership in adhering to routine procedures • attempts to solve problems prior to requesting help.
Construction Techniques (refer to specific module)	**Construction Techniques** (refer to specific module)	**Construction Techniques** (refer to specific module)
Use of Equipment and Materials • uses recommended tools and materials safely • wears the proper personal protective equipment • follows proper lifting, handling and storage procedures • calculates and measures accurately • fulfils given clean-up responsibilities • recognizes potential health and safety hazards.	**Use of Equipment and Materials** • selects and uses appropriate equipment/materials safely • uses proper personal protective equipment • observes proper lifting and handling procedures • calculates and measures accurately • minimizes waste of materials • fulfils expected clean-up responsibilities • recognizes and controls potential health and safety hazards.	**Use of Equipment and Materials** • selects and uses appropriate equipment/materials in a safe and efficient manner • models the correct use of personal protective equipment • makes accurate calculations and measurements • models proper lifting and handling techniques • fulfills clean-up and maintenance responsibilities • identifies and corrects potential health and safety hazards.
Teamwork • works cooperatively with others in structured settings • shares equipment and supplies	**Teamwork** • cooperates with group members in structured and non-structured settings • shares equipment and work appropriately among group members • negotiates solutions to problems.	**Teamwork** • collaborates and works cooperatively with group members • shares responsibilities among group members • negotiates with sensitivity solutions to problems • displays effective communication skills.

ASSESSMENT FRAMEWORK: PROJECT ASSESSMENT CONPRO

INTRODUCTORY	INTERMEDIATE	ADVANCED
The student:	*The student:*	*The student:*
Planning and Management • identifies project outcomes • gathers information from sources provided • generates more than one project idea • selects a project with guidance • makes modifications to pictorial and/or multiviewed drawings as required using appropriate tools • organizes major events from a prepared list of procedures • completes a simple material list and cost estimate • follows prescribed timelines	**Planning and Management** • defines project outcomes • conducts research pertaining to the selection of a project from a variety of sources • generates and considers the suitability of a number of project ideas • selects an appropriate solution that meet project outcomes • produces and accurately dimensions simple pictorial and multiviewed drawings where necessary using basic tools and software • determines the appropriate sequence of events to construction a product in a safe manner • revises work plan to accommodate changing requirements • estimates the required time to complete a task including planning, set-up and clean-up procedures • prepares a list of materials and cost estimate.	**Planning and Management** • determines the project outcomes by analyzing client needs • locates and conducts research from a variety of sources • generates a variety of different solutions and seeks advice from knowledgeable sources • selects a solution that has a high potential for success • produces accurate pictorial and multiviewed drawings complete with dimensions and notations using advanced tools and software • analyzes a product or set of drawings to determine the event sequences • is sensitive to a variety of feedback mechanisms and alters plans when the current approach to task is ineffective • creates a meaningful timeline based on the complexity of the task • prepares a material estimate from a set of working drawings.
Construction Techniques • (refer to specific module and/or project specifications).	**Construction Techniques** • (refer to specific module and/or project specifications).	**Construction Techniques** • (refer to specific module and/or project specifications).
Work Skills • prepares self for task • follows basic instructions as directed • adheres to prescribed time lines • works cooperatively with others in structured settings • uses prescribed personal protective equipment • follows proper lifting, handling and storage procedures • fulfills given clean-up responsibilities.	**Work Skills:** • prepares self for task • follows instructions with limited direction • adheres to established timelines • works cooperatively with others in both structured and non-structured settings • uses proper personal protective equipment • observes proper lifting, handling and storage procedures • fulfills expected clean-up responsibilities.	**Work Skills** • prepares self for task • accurately interprets and follows directions • creates and adheres to detailed timelines • works cooperatively and collaboratively with others • uses appropriate personal protective equipment • models proper lifting, handling and storage procedures • fulfills clean-up and tool maintenance responsibilities
Project Presentation • describes the project and its use • summarizes and reports on major events • evaluates project planning and construction techniques • suggests ways to improve the project.	**Project Presentation** • describes the purpose of the project • summarizes and reports on major events • evaluates the design and production techniques • suggests ways to improve project design and production processes.	**Project Presentation** • describes the purpose and scope of the project • summarizes and reports on major events • assesses design processes and production techniques • makes recommendations to improve product quality and productivity.

PRESENTATIONS/REPORTS: HAND TOOLS — Basic Tools & Materials: CON1010–1

Module Learner Expectation

The student will:

- identify and describe the safe use of basic hand tools

Standard

Performance rating of 1 for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Preparation and Planning
☐ follows instruction accurately
☐ responds to directed questions and follows necessary steps to find answers
☐ accesses basic in-school/community information sources
☐ organizes information in a logical manner
☐ records information accurately using correct technical terms
☐ uses time effectively

Content
☐ develops a chart depicting 20 common hand tools
☐ classifies each tool according to the following categories:
- measurement and layout tools
- cutting/boring tools
- assembly/dismantling tools
- abrading tools

☐ describes the purpose and safe use of each tool

Presenting/Reporting
☐ demonstrates effective use of one or more communication media:
e.g., *__Written__: spelling, punctuation, grammar basic format*
__Oral__: voice projection, body language
__Audio-visual__: techniques, tools
☐ uses correct grammatical convention and technical terms
☐ provides an introduction that describes the purpose of the project
☐ communicates information in a logical sequence

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Preparation and Planning	4 3 2 1 0	1	
Content	4 3 2 1 0	1	
Presenting/ Reporting	4 3 2 1 0	1	

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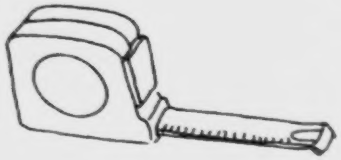
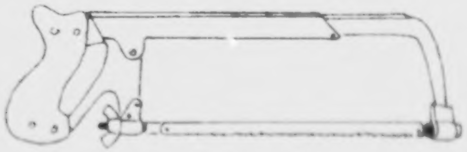
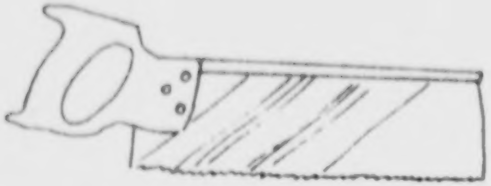
TOOL	CATEGORY	DESCRIPTION
 Measuring Tape	Measurement and Layout Tool	A measuring tape is a spring-loaded steel tape that is carried in a pocket or pouch. It is easy to use and can be purchased in a variety of lengths in both metric and imperial measure. When retracting, care should be taken to avoid contact with the blade.
 Hacksaw	Cutting Tool	A hacksaw is used for straight cuts in metal or plastic. The work piece should be held firmly in place at all times. To avoid blade breakage when cutting thin material, the saw should be held so that at least three teeth are in contact with the material at all times.
 Backsaw	Cutting Tool	A backsaw is used to make accurate straight cuts in wood. It has a thin blade that is stiffened by a rigid frame along its top edge. A bench hook is often used in conjunction with the saw to provide greater accuracy and safety.

For additional sample items and responses, refer to:

Design and Technology. Kathy Browning et. al., 1994. Teacher's Resource.

PRESENTATIONS/REPORTS: MATERIAL IDENTIFICATION

Module Learner Expectation

The student will:

- identify and compare the properties of common materials used in construction and fabrication activities

Standard

Performance rating of 1 for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent.*

0 has not completed *defined* outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Preparation and Planning

☐ follows instructions accurately
☐ responds to directed questions and follows necessary steps to find answers
☐ accesses basic in-school/community information sources
☐ organizes information in a logical manner
☐ records information accurately using correct technical terms
☐ uses time effectively

Content

☐ identifies, in chart form, four or more materials in any two of the following categories:
  – solid and manufactured wood products
  – ferrous and non-ferrous metals
  – thermoforming and thermo-setting plastics
  – clay and concrete products
☐

Content (continued)

☐ provides a sample and description of each material
☐ identifies a common use for each material

Presenting/Reporting

☐ demonstrates effective use of one or more communication media:
  e.g., *__Written__: spelling, punctuation, grammar basic format*
  __Oral__: voice projection, body language
  __Audio-visual__: techniques, tools
☐ uses correct grammatical conventions and technical terms
☐ provides an introduction that describes the purpose of the project
☐ communicates information in a logical manner

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Preparation and Planning	4 3 2 1 0	1	
Content	4 3 2 1 0	1	
Presenting/ Reporting	4 3 2 1 0	1	

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PRESENTATIONS/REPORTS: BUILDING SYSTEMS — Building Construction: CON1070–1

Module Learner Expectation

The student will:

- identify and describe the main systems found in a residential structure

Standard

Performance rating of 1 for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Preparation and Planning

- ☐ follows instructions accurately
- ☐ responds to directed questions and follows necessary steps to find answers
- ☐ accesses basic in-school/community information sources
- ☐ organizes information in a logical manner
- ☐ records information accurately using correct technical terms
- ☐ uses time effectively

Content

- ☐ briefly describes each of the four systems found in a typical residential structure; e.g.:
  - structural
  - electrical
  - plumbing
  - heating venting and air-conditioning

Content (continued)

- ☐ elaborates on the:
  - system components
  - common materials
  - related tools
  - nature of the trades related to the system

Presenting/Reporting

- ☐ demonstrates effective use of one or more communication media:
  - *e.g., Written: spelling, punctuation, grammar basic format*
  - *Oral: voice projection, body language*
  - *Audio-visual: techniques, tools*
- ☐ uses correct grammatical conventions and technical terms
- ☐ provides an introduction that describes the purpose of the project
- ☐ communicates information in a logical sequence

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Preparation and Planning	4 3 2 1 0	1	
Content	4 3 2 1 0	1	
Presenting/ Reporting	4 3 2 1 0	1	

RESEARCH PROCESS: CAREER OPPORTUNITY IN BUILDING CONSTRUCTION

Building Construction: CON1070–2

Module Learner Expectation

The student will:

- profile a trade or occupation within the building construction industry

Standard

Performance rating of 1 for each applicable criteria unless otherwise stated

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Preparation and Planning
☐ sets goals and follows instructions accurately
☐ adheres to established timelines
☐ responds to directed questions and follows necessary steps to find answers
☐ uses time effectively

Information Gathering Process
☐ accesses basic school/community information sources
☐ uses one or more information-gathering techniques
☐ interprets and organizes information in a logical sequence
☐ records information accurately using correct technical terms
☐ distinguishes between fact and fiction / option / theory
☐ responds to feedback when current approaches are not working

Content
☐ identifies one or more occupation or trade related to the building construction industry
☐ lists day-to-day duties of a worker or trades person
☐ describes overall working conditions
☐ assesses local employment opportunities
☐ identifies training programs and entry requirements

Information Sharing
☐ demonstrates effective use of one or more communication media:
e.g., written, oral, audio-visual
☐ communicates information in a logical sequence
☐ uses correct grammatical conventions and technical terms
☐ cites three or more basic information sources

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Preperation and Planning	4 3 2 1 0	1	
Information Gethering and Processing	4 3 2 1 0	1	
Content	4 3 2 1 0	1	
Information Sharing	4 3 2 1 0	1	

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PRESENTATIONS/REPORTS: TECHNOLOGICAL SYSTEM — Project Management: CON1120-1

Module Learner Expectation

The student will:

- identify and describe the parts of a technological system

Standard

Performance rating of 1 for each applicable task

Rating Scale

The student:

4	exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards.*
3	meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent.*
2	meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent.*
1	meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent.*
0	has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Preparation and Planning
☐ follows instructions accurately
☐ responds to directed questions and follows necessary steps to find answers
☐ accesses basic in-school/community information sources
☐ organizes information in a logical manner
☐ records information accurately using correct technical terms
☐ uses time effectively

Content
☐ identifies the major parts of a technological system in chart form to include:
- input
- process
- output
- feedback mechanisms

Content (continued)
☐ provides a brief description of each component
☐ explains the difference between an open and closed system

Presenting/Reporting
☐ demonstrates effective use of one or more communication media:
e.g., *Written:* *spelling, punctuation, grammar basic format*
Oral: *voice projection, body language*
Audio-visual: *techniques, tools*
☐ uses correct grammatical conventions and technical terms
☐ provides an introduction that describes the purpose of the project
☐ communicates information in a logical sequence

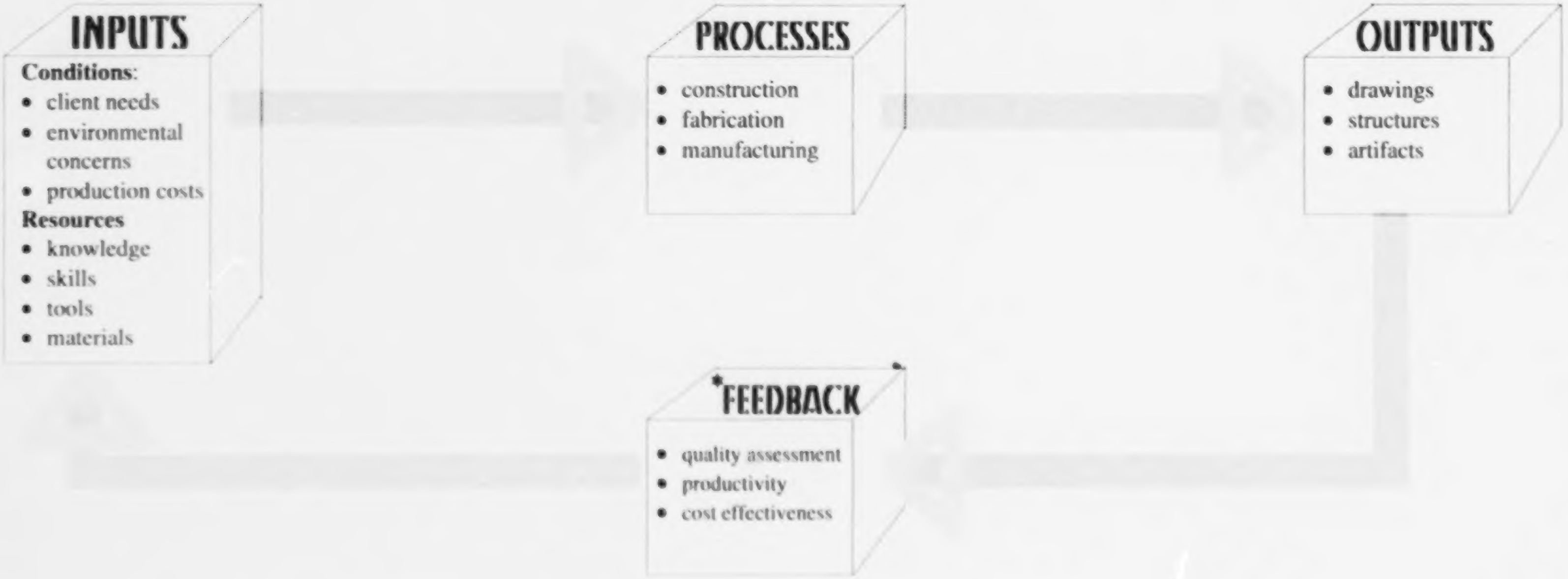
PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Preparation and Planning	4	3	2	1	0	1	
Content	4	3	2	1	0	1	
Presenting/ Reporting	4	3	2	1	0	1	

Presentation

Task:
- identify the basic parts of a technological system
- provide a description of each component
- explain the difference between an open and closed system

Student References:
- *Construction Technology* (2nd and 3rd edition). Mark W. Huth, 1989 & 1996.
- *Living With Technology (2nd edition).* Michael Hacker, 1993.



INPUTS

Conditions:
- client needs
- environmental concerns
- production costs

Resources
- knowledge
- skills
- tools
- materials

PROCESSES
- construction
- fabrication
- manufacturing

OUTPUTS
- drawings
- structures
- artifacts

***FEEDBACK**
- quality assessment
- productivity
- cost effectiveness

* An open system does not have a feedback mechanism.

PROJECT ASSESSMENT: PROJECT DEVELOPMENT AND PRESENTATION — Project Management: CON1120-3

Module Learner Expectations

The student will:

- apply basic drawing skills to prepare a shop drawing
- prepare a project timeline, cost estimate and work schedule
- apply the use of a technological system to construct a simple product with multiple parts

Standard

Performance rating of 1 for each applicable criteria

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Planning and Management (Input)

☐ generates one or more project ideas
☐ identifies project with multiple parts
☐ produces/modifies simple pictorial and or multiviewed sketch or drawing as required
☐ provides accurate dimensions and notes
☐ provides accurate material estimate and work schedule

Construction Techniques (Process)

☐ cuts and secures stock according to plan
☐ creates tight-fitting joints
☐ appropriately assembles and finishes the product

Work Skills (Process)

☐ follows instructions as directed
☐ adheres to established timeline
☐ works cooperatively with others in structured settings
☐ uses appropriate tools, materials and processes
☐ calculates and measures accurately
☐ uses prescribed personal protective equipment
☐ handles, stores and/or disposes of materials as instructed

Project Presentation (Output and Feedback)

☐ describes the project and its intended use
☐ summarizes and reports on major production events
☐ assesses the design and production processes
☐ recommends changes to improve quality, performance and appearance

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Planning and Management	4	3	2	1	0	1	
Construction Techniques	4	3	2	1	0	1	
Work Skills	4	3	2	1	0	1	
Project Presentation	4	3	2	1	0	1	

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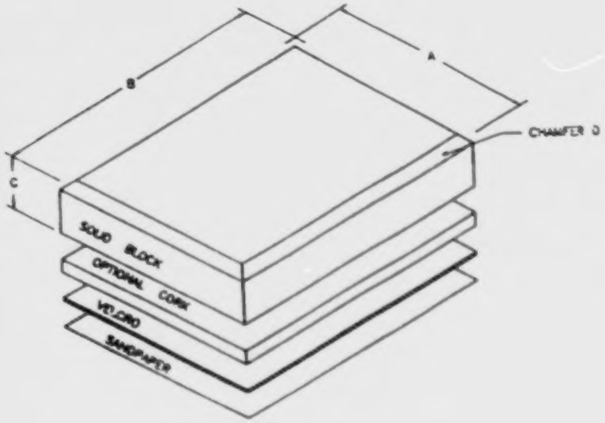
Rationale:

A simple product such as this sanding block can be used to show students how input, process, output and feedback mechanisms can be used to plan and manage a project.



Specifications:

	Metric	Imperial
A	75 mm	3"
B	100 mm	4"
C	20 mm	¾"
D	6 mm	¼"

1. Materials – Pine or other suitable solid wood.
2. Size: this can be adapted for the situation a common size is 20 mm x 75 mm x 100 mm or ¾" x 3" x 4". **TOLERANCE – ± 2mm or ± 1/16".**
3. The cork is cut oversized and is attached with contact cement.
4. Velcro with a stick back is applied over the cork.
5. Sizes of sandpaper (special type with back that is attachable to Velcro) can be cut to the block dimensions.

MATERIAL ESTIMATE							COST ESTIMATE	
Component	#	T	W	L	Material Type	Material Amount	Unit Cost	Total Cost

TIME ESTIMATE Start ________ Finish ________

FINISH: $________

SUB-TOTAL: $________

SHOP FEE: $________

TOTAL HOURS: ____________

TOTAL COST: $________

Event Sequence:

1. Given a rough piece of lumber, measure and layout the appropriate measurements.
2. Crosscut the material to length.
3. Plan the face side and face edge.
4. Measure and layout the lines for width and thickness.
5. Plane the block down to size. (Measure twice – cut once!!)
6. Mark a 6 mm (1/4") chamfer.
7. Plane a chamfer between layout lines.
8. Cut the cork a little over size and glue to the bottom.
9. Once the glue is dry, trim with a fine set plane.
10. Carefully cut and attach velcro to the cork.
11. Cut a piece of sandpaper and attach it to the velcro.
12. Clean up the block and hand it in for evaluation.

Project developed by Brian Larson, Lacombe Composite High School, Lacombe

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Module Learner Expectation

The student will:

- identify and describe the physical characteristics of a variety of hard and soft woods

Standard

Response rating of 1

Rating Scale

The student:

4 independently makes explanations and critical judgements based on a superior knowledge base and understanding of content and related issues.

3 makes explanation and comparisons of content using precise terminology. Requires little or no prompting.

2 applies knowledge of content to different situations using accurate terminology. May require some prompting.

1 uses simple recall to demonstrate basic knowledge and understanding of content. May require frequent prompting.

0 is unable to provide a suitable response at this time.

Sample Item(s)	Sample Response(s)
1. All woods have their own unique characteristics. Identify and describe four different woods used in solid stock construction.	Pine (Western White Pine): Western pine is a close grained soft wood that has a cream to light brown colour. It works easily with tools and resists splitting. Mahogany: Mahogany is a moderately hard wood that varies from a pale to deep reddish brown colour. This wood has excellent working and finishing characteristics even though its open pores require filling before finishing. Red Oak: Red Oak has a noticeable reddish tint. Pores are open and usually require filling before finishing. Drying must be done slowly to avoid checking and warping. Red Oak has good machining qualities. Poplar: Poplar is a light weight moderately priced hard wood. It works well with hand and power tools. Its colour ranges from a pale olive brown to greenish white.
2. What is the difference between a hard wood and a soft wood?	Hard woods come from broad leaf (deciduous) trees. Soft woods come from needle leaf (coniferous) trees.
3. Describe four common wood defects associated with solid lumber	Common wood defects include: – loose knots – checks or splits at the ends of boards – pitch pockets commonly found in soft woods – warping caused by improper drying and/or storage.

For additional items and responses refer to:

- *Exploring Woodworking: Fundamentals of Technology.* Fred W. Zimmerman et al. 1993. Text and Workbook.
- *Technology Shaping Our World.* John Gradwell et. al., 1996. Text and Instructor's Manual.

PROJECT ASSESSMENT: BUILDING WITH SOLID STOCK

Solid Stock Construction: CON1130–2

Module Learner Expectation

The student will:

- construct a wooden product, using basic joinery techniques

Standard

Performance rating of 1 for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Planning and Management
☐ defines project requirement
☐ gathers background information from sources provided
☐ generates one or more project idea
☐ produces/modifies simple pattern or template
☐ provides accurate dimensions and notes

Construction Techniques
☐ cuts and squares stock according to plan
☐ assembles and glues stock correctly
☐ surfaces and finishes to size
☐ shapes handle according to pattern
☐ applies suitable finish

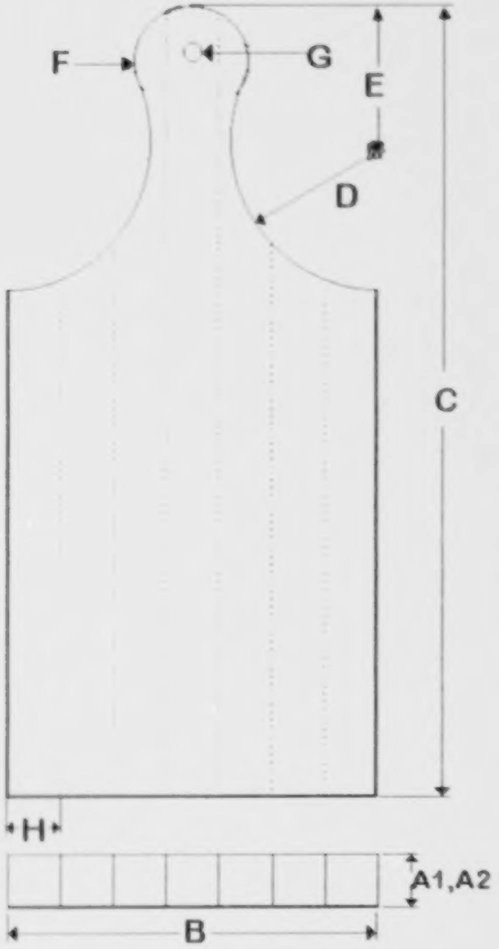
Work Skills
☐ follows instructions as directed
☐ adheres to established timeline
☐ works cooperatively with others in structured settings
☐ uses appropriate tools, materials and processes
☐ calculates and measures accurately
☐ uses recommended personal protective equipment
☐ handles, stores and/or disposes of materials as instructed
☐ ____________________

Project Presentation (Output and Feedback)
☐ describes the project and its intended use
☐ summarizes and reports on major production events
☐ assesses the design and production processes
☐ recommends changes to improve quality, performance and appearance

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Planning and Management	4	3	2	1	0	1	
Construction Techniques	4	3	2	1	0	1	
Work Skills	4	3	2	1	0	1	
Project Presentation	4	3	2	1	0	1	

ILLUSTRATIVE EXAMPLE: Cutting Board — Solid Stock Construction: CON1130–3



Recommended Materials

1 – 19 mm x 160 mm x 305 mm (3/4" x 6 ¼" x 12") surfaced two sides maple or birch with vegetable oil finish.

Specifications

Part	Metric	Imperial	Notes
A1	22 mm	7/8"	Rough size
A2	19 mm	¾"	Finished size
B	135 mm	5 ¼"	Finished size
C	300 mm	11 3/4"	Finished size
D	50 mm R	2" R	Finished size
E	50 mm	2"	
F	22 mm R	7/8" R	Finished size
G	6 mm D	¼" D	Centre hole
H	19 mm	¾"	Finished size

Quality Indicators

Assessment Criteria	Standard	Finished Product
Thickness 19 mm (3/4")	± 2 mm (1/16")	
Width 135 mm (5 ¼")	± 2 mm (1/16")	
Length 300 mm (11 ¾")	± 2 mm (1/16")	
Handle Shape	Evenly sculptured and smooth	
Surface Finish	Free of marks, gouges, burns and voids	

Construction Overview

Steps	Event Sequence
1.	Cut stock to length
2.	Surface face sides if necessary
3.	Rip strips for gluing
4.	Assemble and glue stock
5.	Surface face sides
6.	Lay out pattern
7.	Cut out shape of board
8.	Drill hole in handle
9.	Surface edges to size
10.	Prepare surfaces for finishing
11.	Apply finish.

COMMENTS:

Source: Adapted from material provided by the Northern Alberta Institute of Technology, Woodworking Section.

RESPONSE ASSESSMENT: CHARACTERISTICS OF MANUFACTURED MATERIALS

Manufactured Materials: CON1160–1

Module Learner Expectation

The student will:

- identify and describe the characteristics of common manufactured materials

Standard

Response rating of 1

Rating Scale

The student:

4 independently makes explanations and critical judgements based on a superior knowledge base and understanding of content and related issues.

3 makes explanation and comparisons of content using precise terminology. Requires little or no prompting.

2 applies knowledge of content to different situations using accurate terminology. May require some prompting.

1 uses simple recall to demonstrate basic knowledge and understanding of content. May require frequent prompting.

0 is unable to provide a suitable response at this time.

Sample Item(s)	Sample Response(s)
1. List four manufactured sheet materials. 2. Describe how they are made and identify one or more of their main characteristics.	Plywood: Plywood is made from an odd number of thin sheets of wood glued together so that the grain is at right angles to the grain in the next layer. Plywood is very strong, resists warpage and can be finished in a variety of ways. Blockboard: Blockboard is made from a core of solid pieces covered with a veneer on each side. Blockboard is strong and easily finished. Particleboard: Particleboard is made from small wood chips that are glued and pressed together into sheets with very smooth surfaces suitable for painting or plastic laminates. Particle board tends to break easily and does not hold nails or screws well. Waferboard: Waferboard is made from flakes of wood that are bonded together, under heat and pressure, with a waterproof adhesive. This material is strong and less expensive than plywood.

For additional items and responses refer to:

- *Exploring Woodworking: Fundamentals of Technology.* Fred W. Zimmerman et al. 1993. Text and Workbook.
- *Technology Shaping Our World.* John Gradwell et. al., 1996. Text and Instructor's Manual.

PROJECT ASSESSMENT: BUILDING WITH MANUFACTURED MATERIALS

Manufactured Materials: CON1160–2

Module Learner Expectation

The student will:

- create a product from a manufactured material, using basic joinery techniques

Standard

Performance rating of 1 for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Planning and Management

☐ defines project requirement
☐ gathers background information from sources provided
☐ generates one or more project idea
☐ produces/modifies simple pictorial and or multiviewed sketch or drawing as required
☐ provides accurate dimensions and notes

Construction Techniques

☐ assembles and finishes according to the project plan
☐ cuts and squares stock according to plan
☐ assembles and fastens stock as indicated
☐ finishes surfaces as required

Work Skills

☐ uses appropriate tools, materials and processes
☐ measures and cuts accurately
☐ follows instructions as directed
☐ adheres to established timeline
☐ works cooperatively with others in structured settings
☐ uses recommended personal protective equipment
☐ handles, stores and/or disposes of materials as instructed

Project Presentation

☐ describes the project and its intended use
☐ summarizes and reports on major production events
☐ assesses the design and production processes
☐ recommends changes to improve quality, performance and appearance

PERFORMANCE ASSESSMENT

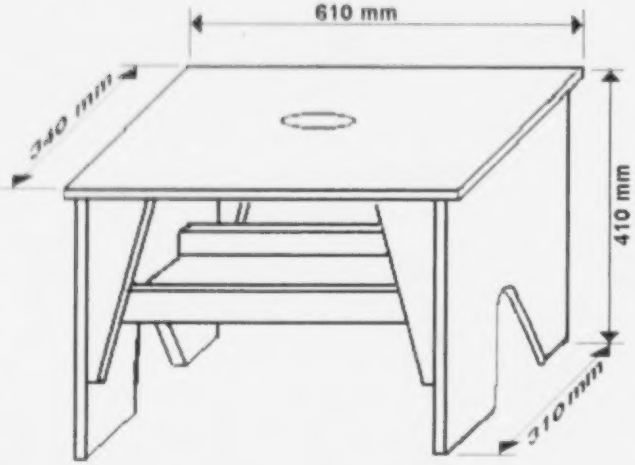
CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Planning and Management	4 3 2 1 0	1	
Construction Techniques	4 3 2 1 0	1	
Work Skills	4 3 2 1 0	1	
Project Presentation	4 3 2 1 0	1	

ILLUSTRATIVE EXAMPLE: PORTABLE WORK BENCH

Manufactured Materials: CON1160–3

Rationale:

A portable workbench can be put to many uses on the job or around the house. This project can be made from off-cuts of plywood and other manufactured materials. Besides availability, consideration should also be given to the strength and weight of the materials.



Note:
Dimensions may need to be altered to fit available materials. Glue and nail simple edge and butt joints.

MATERIAL ESTIMATE							COST ESTIMATE	
Component	#	T	W	L	Material Type	Material Amount	Unit Cost	Total Cost

TIME ESTIMATE Start ________ Finish ________

TOTAL HOURS: ________

FINISH: $______
SUB-TOTAL: $______
SHOP FEE: $______
TOTAL COST: $______

Quality Indicators

	Assessment Criteria	Standard	Finished Product
DIMENSIONING	- overall height: 410 mm	∓ 2mm	
	- overall width: 310 mm	∓ 2mm	
	- overall length: 6 10 mm	∓ 2mm	
	- location of hand hole	centred	
SQUAREING	- top is cut square	Run out not	
	- legs are cut square	more than	
	- supports are cut square	1 mm over	
	- tray is cut square	100 mm	
ASSEMBLING	- overall fit	tight	
	- use of fasteners	evenly spaced	
	- wobble	stable on flat surface	
FINISHING	- evidence of chipping	minimal	
	- evidence of cross sanding	minimal	
	- coating	evenly applied	

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RESPONSE ASSESSMENT: CHARACTERISTICS OF CASTING/MOLDING MATERIALS — Mold Making & Casting: CON1180–1

Module Learner Expectation

The student will:

- list and describe common materials and processes used in casting/molding

Standard

Response rating of 2

Rating Scale

The student:

4 independently makes explanations and critical judgements based on a superior knowledge base and understanding of content and related issues.

3 makes explanation and comparisons of content using precise terminology. Requires little or no prompting.

2 applies knowledge of content to different situations using accurate terminology. May require some prompting.

1 uses simple recall to demonstrate basic knowledge and understanding of content. May require frequent prompting.

0 is unable to provide a suitable response at this time.

Sample Item(s)	Sample Response(s)
1. Identify three common casting/molding materials. 2. Describe how these materials are prepared for casting/molding.	Clay slip: Water is added to clay to form a slurry that can be poured into a plaster mold. Concrete Concrete is a mixture of water, aggregate (sand and gravel) and cement that can be poured into a mold for form. Polystyrene beads Polystyrene beads are heated in a chamber to a liquid state and then forced into a mold cavity by means of an injection press.

For additional items and responses, refer to:

- *Production Technology*. Stanley G. Komacek, 1993. Text.
- *Design and Technology*. Kathy Browning et. al., 1994. Teacher's Resource.

RESEARCH PROCESS: PREPARING A BUILDING SITE

Site Preparation: CON2010–1

Module Learner Expectation

The student will:

- identify and describe typical building site layout and excavation processes

Standard

Performance rating of 2 for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Preparation and Planning

☐ sets goals and establishes steps to achieve them
☐ creates and adheres to useful timelines
☐ uses personal initiative to formulate questions and find answers
☐ plans and uses time effectively

Information Gathering and Processing

☐ accesses a range of relevant school/community information resources
☐ uses a range of information-gathering techniques
☐ interprets, organizes and combines information into a logical sequence
☐ determines accuracy/currency/reliability of information sources

Content

☐ determines parameters for selecting a building site including local codes, relation to other buildings, solar orientation and other local conditions
☐ describes typical methods to establish grade levels, lot and building lines

Content (continued)

☐ identifies and describes typical tools used in site work
☐ describes how batterboards and building lines are located
☐ discusses methods of excavating
☐ determines soil conditions
☐ describes hazards related to excavation and the need to locate all utility services
☐ assesses need for backsloping or shoring unstable soil

Collaboration and Teamwork

☐ cooperates with group members
☐ shares work appropriately among group members
☐ negotiates solutions to problems

Information Sharing

☐ demonstrates effective use of two or more communication media:
e.g., written, oral, audio-visual
☐ communicates ideas in a logical sequence with sufficient supporting detail
☐ maintains acceptable grammatical and technical standards
☐ cites two or more basic information sources

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Preparation and Planning	4 3 2 1 0	2	
Information Gathering and Processing	4 3 2 1 0	2	
Content	4 3 2 1 0	2	
Collaboration and Teamwork	4 3 2 1 0	2	
Information Sharing	4 3 2 1 0	2	

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ACTIVITY ASSESSMENT: BUILDING SITE LAYOUT

Site Preparation: CON2010–2

Module Learner Expectation

The student will:

- apply site preparation skills to assist in the location of building site lines and features

Standard

Performance rating of 2 or as stated for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Planning and Management

☐ prepares self for task
☐ organizes and works in an orderly manner
☐ interprets and carries out instructions accurately
☐ plans and uses time effectively
☐ adheres to routine procedures

Construction Techniques

☐ uses plot plan to determine property lines, setback and finish grade
☐ lays out building features using a builders transit or level
☐ locates building lines using batterboards and plumb bob
☐ checks for square using 3, 4, 5 method

Use of Equipment and Materials

☐ selects and uses appropriate equipment/materials safely
☐ uses proper personal protective equipment
☐ follows proper lifting and handling procedures
☐ calculates and measures accurately
☐ minimizes waste of materials
☐ recognizes and controls potential health and safety hazards

Teamwork

☐ cooperates with group members
☐ shares work appropriately among group members
☐ negotiates solutions to problems

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Planning and Management	4 3 2 1 0	2	
Construction Techniques	4 3 2 1 0	1	
Use of Equipment and Materials	4 3 2 1 0	2	
Teamwork	4 3 2 1 0	2	

Module Learner Expectations

The student:

- list and describe factors that affect footing and wall design
- identify and describe common forming materials and processes

Standard

Response rating of 2

Rating Scale

The student:

4 independently makes explanations and critical judgements based on a superior knowledge base and understanding of content and related issues.

3 makes explanations and comparisons of content using precise terminology. Requires little or no prompting.

2 applies knowledge of content to different situations using accurate terminology. May require some prompting.

1 uses simple recall to demonstrate basic knowledge and understanding of content. May require frequent prompting.

0 is unable to provide a suitable response at this time.

Sample Item(s)	**Sample Response(s)**
1. List the factors that affect footing and wall design.	Factors that affect footing and wall design include: • soil, water and frost conditions • site and building features.
2. Describe the important features of a concrete form.	Formwork for a concrete structure must be tight enough to prevent leaking, well braced and tied together to withstand the pressure of the concrete before it hardens. In addition, the forms should be easy to handle and strip.
3. Identify and describe two forming systems used in residential construction.	Prefabricated panels This system commonly uses predrilled plywood panels, snap ties and walers to create a form. The panels are reusable and adaptable to a wide variety of foundation shapes. Polystyrene Block This system uses interlocking hollow polystyrene foam blocks that remain in place after they are filled with concrete. Besides using less concrete the system does not require additional insulation.
4. Give two reasons for applying a release agent to a set of wall forms.	A release agent is applied to a form to: • prevent the forms from sticking to the concrete • protect the form from peeling.

For additional items and responses, refer to:

- *Modern Carpentry*. Willis H. Wagner et. al., 1992 and 1996 editions. Text and Workbook.

ACTIVITY ASSESSMENT: CONCRETE FORMING AND PLACING

Concrete Forming: CON2020–2

Module Learner Expectation

The student will:

- apply concrete forming skills to assist in forming and placing a concrete foundation

Standard

Performance rating of 2 for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Planning and Management
- ☐ prepares self for task
- ☐ organizes and works in an orderly manner
- ☐ interprets and carries out instructions accurately
- ☐ plans and uses time effectively

Construction Techniques
- ☐ uses foundation plan to locate and size all openings
- ☐ adjusts forms to accommodate box sill or cast in place construction
- ☐ assembles components to meet stated dimension tolerances
- ☐ reinforces forms to maintain their position
- ☐ consolidates concrete to prevent honeycombing
- ☐ levels and finishes concrete appropriately
- ☐ allows concrete to cure properly before stripping

Use of Equipment and Materials
- ☐ selects and uses appropriate equipment/materials safely
- ☐ uses proper personal protective equipment
- ☐ follows proper lifting and handling procedures
- ☐ calculates and measures accurately
- ☐ minimizes waste of materials
- ☐ recognizes and controls potential health & safety hazards

Teamwork
- ☐ cooperates with group members
- ☐ shares work appropriately among group members
- ☐ negotiates solutions to problems

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Planning and Management	4 3 2 1 0	2	
Construction Techniques	4 3 2 1 0	2	
Use of Equipment and Materials	4 3 2 1 0	2	
Teamwork	4 3 2 1 0	2	

Module Learner Expectations

The student will:

- identify and describe the components of an alternative foundation system
- identify the health hazards and precautions related to the use of engineered materials

Standard

Performance rating of 2 or as stated for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Preparation and Planning

- ☐ sets goals and describes steps to achieve them
- ☐ uses personal initiative to formulate questions and find answers
- ☐ accesses a range of relevant in-school/community information sources
- ☐ interprets, organizes and combines information into logical sequence
- ☐ records information accurately with appropriate supporting detail and uses correct technical terms
- ☐ plans and uses time effectively

Content

- ☐ identifies factors that affect the design of a wood foundation, such as:
  - number of floors
  - live loads
  - lateral stress
- ☐ describes the design features of a preserved wood foundations, including:
  - gravel base and drainage system
  - framing features complete with window opening
  - sheathing and caulking procedures
  - protective covering
  - finishing techniques

Content (continued)

- ☐ explains the health hazards and safety precautions that are required when using treated materials and wood preservatives such as:
  - wearing a dust mask
  - washing exposed areas of skin before eating
  - laundering clothes separate from other clothes
  - not burning treated wood

Presenting/Reporting

- ☐ demonstrates effective use of one or more communication media
  - *e.g.,* *Written**: spelling, punctuation, grammar basic format*
  - *Oral**: voice projection, body language*
  - *Audio-visual**: techniques, tools*
- ☐ maintains acceptable grammatical and technical standards through proofreading and editing
- ☐ provides an introduction that describes the purpose and scope of the project
- ☐ communicates ideas into a logical sequence with sufficient supporting detail
- ☐ provides a reference list that includes two or more relevant information sources

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Preparation and Planning	4	3	2	1	0	2	
Content	4	3	2	1	0	1	
Presenting/ Reporting	4	3	2	1	0	2	

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ACTIVITY ASSESSMENT: WOOD FOUNDATION FRAMING

Alternate Foundations: CON2030–2

Module Learner Expectation

The student will:

- apply construction skills to assist in the design/construction of an alternative foundation system

Standard

Performance rating of 2 for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Planning and Management
☐ prepares self for task
☐ organizes and works in an orderly manner
☐ interprets and carries out instructions accurately
☐ plans and uses time effectively

Construction Techniques
☐ follows design specification for order and/or selecting materials
☐ creates appropriate gravel base
☐ frames and sheaths walls according to the engineering drawings
☐ seals and protects exterior surfaces
☐ back fills and finishes according to plan

Use of Equipment and Materials
☐ selects and uses appropriate equipment/materials safely
☐ uses proper personal protective equipment
☐ follows proper lifting and handling procedures
☐ calculates and measures accurately
☐ minimizes waste of materials
☐ recognizes and controls potential health and safety hazards

Teamwork
☐ cooperates with group members
☐ shares work appropriately among group members
☐ negotiates solutions to problems

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Planning and Management	4 3 2 1 0	2	
Construction Techniques	4 3 2 1 0	2	
Use of Equipment and Materials	4 3 2 1 0	2	
Teamwork	4 3 2 1 0	2	

Module Learner Expectation

The student will:

- identify and describe the parts of a floor and wall framing system

Standard

Response rating of 2

Rating Scale

The student:

4 independently makes explanations and critical judgements based on a superior knowledge base and understanding of content and related issues.

3 makes explanation and comparisons of content using precise terminology. Requires little or no prompting.

2 applies knowledge of content to different situations using accurate terminology. May require some prompting.

1 uses simple recall to demonstrate basic knowledge and understanding of content. May require frequent prompting.

0 is unable to provide a suitable response at this time.

Sample Item(s)	Sample Response(s)
1. Identify and describe two systems used to frame residential structures.	Platform Framing. In platform construction the floor is constructed first followed by the walls that can be constructed ahead of time off site or assembled on site after the sub-floor is applied. Balloon Framing Balloon framing is used in two story structures. The studs extend from the sill plate to the top plate of the second floor. This system eliminates the need for an joint to allow for shrinkage between floors.
2. From a floor frame mock-up or diagram, identify the following parts: • single and double header • regular joist • tail joist • cantilever joist • double trimmer • bridging.	
3. From a floor frame mock-up or diagram, identify the following parts: • sole plate • regular stud • top and cap plates • rough sill • lintel header • trimmer • upper and lower crippler.	
4. From a current National Building Code of Canada table, determine the maximum span of a 38 x 235 #1 Douglas Fir joist with diagonal bridging only on 400 mm spacing for living quarters.	According to the 1990 edition of the National Building Code, the maximum span is 4.38 m.

For additional items and responses, refer to:

- *Modern Carpentry*. Willis H. Wagner et. al., 1996. Text and Instructor's Manual.

ACTIVITY ASSESSMENT: FLOOR AND WALL FRAMING

Framing Systems 1 (Floor & Wall): CON2040–2

Module Learner Expectations

The student will:

- read and interpret the appropriate drawings and specifications to create a floor and wall framing and sheathing estimate
- apply framing skills to assist in the layout and construction of floor and wall components

Standard

Performance rating of 2 for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*

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1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Planning and Management

☐ prepares self for task
☐ organizes and works in an orderly manner
☐ interprets and carries out instructions accurately
☐ plans and uses time effectively
☐ prepares a list of materials, cost estimate and cutting lists from a set of working drawings
☐ calculates waste and over-run requirements

Construction Techniques

☐ follows floor and wall plan to lay out components
☐ cuts and assembles framing components according to plan
☐ squares floor and wall components prior to installing sub-floor and wall sheathing
☐ erects, plumbs and braces wall sections

Use of Equipment and Materials

☐ selects and uses appropriate equipment/materials safely
☐ uses proper personal protective equipment
☐ follows proper lifting and handling procedures
☐ calculates and measures accurately
☐ minimizes waste of materials
☐ recognizes and controls potential health and safety hazards

Teamwork

☐ cooperates with group members
☐ shares work appropriately among group members
☐ negotiates solutions to problems

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Planning and Management	4 3 2 1 0	2	
Construction Techniques	4 3 2 1 0	2	
Use of Equipment and Materials	4 3 2 1 0	2	
Teamwork	4 3 2 1 0	2	

RESPONSE ASSESSMENT: ROOF CONSTRUCTION — Roof Structures 1 (Framing & Finishing): CON2050–1

Module Learner Expectation

The student will:

- identify and describe the different styles and parts of a roof system

Standard

Response rating of 2

Rating Scale

The student:

4 independently makes explanations and critical judgements based on a superior knowledge base and understanding of content and related issues.

3 makes explanation and comparisons of content using precise terminology. Requires little or no prompting.

2 applies knowledge of content to different situations using accurate terminology. May require some prompting.

1 uses simple recall to demonstrate basic knowledge and understanding of content. May require frequent prompting.

0 is unable to provide a suitable response at this time.

Sample Item(s)	Sample Response(s)
1. From pictures or diagrams, identify the following styles and parts of roof systems: • gable • hip • shed • gambrel.	
2. Identify and describe two common methods of framing a roof.	Rafter System Traditional rafter systems are still used for unusual roof designs, for open ceilings or attic space requirements. Truss System Roof trusses are prefabricated components that are designed and built in a factory to meet most roof shapes and loading specifications. Trusses can be erected quickly and easily.
3. From a mock-up or drawing, identify the parts of rafter systems: • common rafter • ridge board • collar tie • ceiling joist.	
4. From a standard W or Fink truss, identify the following members: • top chord • bottom cord • tension web • compression web.	

For additional items and responses, refer to:

- *Modern Carpentry*. William H. Wagner et. al., 1996. Text and Instructor's Manual.

ACTIVITY ASSESSMENT: ROOF CONSTRUCTION

Roof Structures 1 (Framing & Finishing): CON2050–2

Module Learner Expectations

The student will:

- read and interpret the appropriate drawings and specifications to create a roof framing and finishing estimate
- apply roofing skills to assist in the framing and finishing of a roof structure

Standard

Performance rating of 2 for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*

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1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Planning and Management
- ☐ prepares self for task
- ☐ organizes and works in an orderly manner
- ☐ interprets and carries out instructions accurately
- ☐ plans and uses time effectively
- ☐ prepares a material list from a roof plan
- ☐ creates a cutting list
- ☐ calculates waste and over run requirements
- ☐ estimates material costs

Construction Techniques
- ☐ cuts and/or assembles rafters/trusses according to plan
- ☐ plumbs and braces roof components
- ☐ install look-outs, fascia and braces
- ☐ applies sheathing and shingles according to manufacturers recommendations

Use of Equipment and Materials
- ☐ selects and uses appropriate equipment/materials safely
- ☐ uses proper personal protective equipment
- ☐ follows proper lifting and handling procedures
- ☐ calculates and measures accurately
- ☐ minimizes waste of materials
- ☐ recognizes and controls potential health and safety hazards

Teamwork
- ☐ cooperates with group members
- ☐ shares work appropriately among group members
- ☐ negotiates solutions to problems

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Planning and Management	4 3 2 1 0	2	
Construction Techniques	4 3 2 1 0	2	
Use of Equipment and Materials	4 3 2 1 0	2	
Teamwork	4 3 2 1 0	2	

PRESENTATIONS/REPORTS: WINDOW/DOOR AND SIDING MATERIALS Exterior Finishing (Door, Window & Siding): CON2060–1

Module Learner Expectation

The student will:

- identify and describe common types of exterior doors, windows and siding materials

Standard

Performance rating of 2 or as stated for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*

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0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student

Preparation and Planning

☐ sets goals and describes steps to achieve them
☐ uses personal initiative to formulate questions and find answers
☐ accesses a range of relevant in-school/community information sources
☐ interprets, organizes and combines information into logical sequence
☐ records information accurately with appropriate supporting detail and uses correct technical terms
☐ plans and uses time effectively

Content

☐ lists and describes three basic window designs, e.g.:
  – sliding
  – swing
  – fixed

Content (continued)

☐ lists and describes two door types, e.g.:
  – wood
  – metal
  – fibreglass
☐ lists and describes wood, vinyl and aluminium siding materials and installation techniques

Presenting/Reporting

☐ demonstrates effective use of one or more communication media
e.g., Written: spelling, punctuation, grammar basic format
Oral: voice projection, body language
Audio-visual: techniques, tools
☐ maintains acceptable grammatical and technical standards through proofreading and editing
☐ provides an introduction that describes the purpose and scope of the project
☐ communicates ideas into a logical sequence with sufficient supporting detail
☐ provides a reference list that includes two or more relevant information sources

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Preparation and Planning	4 3 2 1 0	2	
Content	4 3 2 1 0	1	
Presenting/ Reporting	4 3 2 1 0	2	

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ACTIVITY ASSESSMENT: INSTALLING DOORS, WINDOWS AND SIDING   Exterior Finishing (Door, Window & Siding): CON2060–2

Module Learner Expectations

The student will:

- read and interpret the appropriate drawings and specifications to create a door and window schedule and siding estimate
- apply finishing skills to install a prehung door, a window unit and siding materials

Standard

Performance rating of 2 for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*

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0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Planning and Management

☐ prepares self for task
☐ organizes and works in an orderly manner
☐ interprets and carries out instructions accurately
☐ plans and uses time effectively
☐ uses elevation drawings and notes to develop a door and window schedule
☐ reads elevation drawing to determine siding type and quantities
☐ calculates allowances for wall openings and waste requirements

Construction Techniques

☐ prepares and installs window and doors according to manufacturer's recommendations
☐ installs siding according to standard practice and manufacturer's recommendations

Use of Equipment and Materials

☐ selects and uses appropriate equipment/materials safely
☐ uses proper personal protective equipment
☐ follows proper lifting and handling procedures
☐ calculates and measures accurately
☐ minimizes waste of materials
☐ recognizes and controls potential hazards

Teamwork

☐ cooperates with group members
☐ shares work appropriately among group members
☐ negotiates solutions to problems

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Planning and Management	4 3 2 1 0	2	
Construction Techniques	4 3 2 1 0	2	
Use of Equipment and Materials	4 3 2 1 0	2	
Teamwork	4 3 2 1 0	2	

PRESENTATIONS/REPORTS: ELECTRICAL SYSTEMS

Electrical Systems: CON2070–1

Module Learner Expectation

The student will:

- list and describe the electrical systems and components associated with residential wiring

Standard

Performance rating of 2 or as stated for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*

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0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student

Preparation and Planning

☐ sets goals and describes steps to achieve them
☐ uses personal initiative to formulate questions and find answers
☐ accesses a range of relevant in-school/community information sources
☐ interprets, organizes and combines information into logical sequence
☐ records information accurately with appropriate supporting detail and uses correct technical terms
☐ plans and uses time effectively

Content

☐ identifies common types of electrical systems found in a modern residence, such as:
  - lighting
  - utility
  - heating
  - communication
  - alarm system

Content (continued)

☐ identifies the different voltage levels commonly found in each system
☐ lists four appliances and power requirements found in a home

Presenting/Reporting

☐ demonstrates effective use of one or more communication media
  e.g., Written: spelling, punctuation, grammar basic format
  Oral: voice projection, body language
  Audio-visual: techniques, tools
☐ maintains acceptable grammatical and technical standards through proofreading and editing
☐ provides an introduction that describes the purpose and scope of the project
☐ communicates ideas into a logical sequence with sufficient supporting detail
☐ provides a reference list that includes two or more relevant information sources

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Preparation and Planning	4	3	2	1	0	2	
Content	4	3	2	1	0	1	
Presenting/ Reporting	4	3	2	1	0	2	

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ACTIVITY ASSESSMENT: BRANCH WIRING

Electrical Systems: CON2070–2

Module Learner Expectations

The student will:

- apply wiring principles and code requirements to create a wiring diagram
- apply wiring skills to assist in the installation of a residential wiring system

Standard

Performance rating of 2 for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Planning and Management

☐ prepares self for task
☐ organizes and works in an orderly manner
☐ interprets and carries out instructions accurately
☐ plans and uses time effectively
☐ uses standard drawing symbols
☐ clearly identifies connections and components
☐ follows code requirements

Construction Techniques

☐ installs a branch circuit to include three or more of the following:
  – general purpose receptacle
  – light fixture
  – single and three-way switch
  – split receptacle
☐ follows drawing and code requirements
☐ tests circuits for continuity and correct grounding

Use of Equipment and Materials

☐ selects and uses appropriate equipment/materials safely
☐ uses proper personal protective equipment
☐ follows proper lifting and handling procedures
☐ calculates and measures accurately
☐ minimizes waste of materials
☐ recognizes and controls potential health and safety hazards

Teamwork

☐ cooperates with group members
☐ shares work appropriately among group members
☐ negotiates solutions to problems

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Planning and Management	4	3	2	1	0	2	
Construction Techniques	4	3	2	1	0	2	
Use of Equipment and Materials	4	3	2	1	0	2	
Teamwork	4	3	2	1	0	2	

RESEARCH PROCESS: CAREER OPPORTUNITIES IN ELECTRICAL WORK

Electrical Systems: CON2070–3

Module Learner Expectation

The student will:

- profile a trade or occupation within the electrical field

Standard

Performance rating of 2 for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*

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1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Preparation and Planning

☐ sets goals and establishes steps to achieve them
☐ creates and adheres to timelines
☐ uses personal initiative to formulate questions and find answers
☐ plans and uses time effectively

Information Gathering and Processing

☐ accesses a range of relevant school/community information resources
☐ uses a range of information-gathering techniques
☐ interprets, organizes and combines information into a logical sequence
☐ determines accuracy/currency/reliability of information sources

Content

☐ identifies one or more occupation or trade related to electrical work
☐ lists day-to-day duties of a worker or trades person
☐ describes overall working conditions
☐ assesses local employment opportunities
☐ identifies training programs and entry requirements

Information Sharing

☐ demonstrates effective use of two or more communication media:
e.g., written, oral, audio-visual
☐ communicates ideas in a logical sequence with sufficient supporting detail
☐ maintains acceptable grammatical and technical standards
☐ cites one or more basic information sources

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Preparation and Planning	4	3	2	1	0	2	
Information Gathering and Processing	4	3	2	1	0	2	
Content	4	3	2	1	0	2	
Information Sharing	4	3	2	1	0	2	

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PRESENTATIONS/REPORTS: COMMON PLUMBING SYSTEMS

Plumbing Systems: CON2080–1

Module Learner Expectation

The student will:

- identify and describe the parts of a residential plumbing system

Standard

Performance rating of 2 or as stated for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*

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1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student

Preparation and Planning
- ☐ sets goals and describes steps to achieve them
- ☐ uses personal initiative to formulate questions and find answers
- ☐ accesses a range of relevant in-school/community information sources
- ☐ interprets, organizes and combines information into logical sequence
- ☐ records information accurately with appropriate supporting detail and uses correct technical terms
- ☐ plans and uses time effectively

Content
- ☐ identifies the parts of a residential plumbing system:
  - – water supply
  - – drainage
  - – waste
  - – venting systems

Content (continued)
- ☐ describes the types of pipes, tubes and fittings commonly found in a plumbing system
- ☐ provide examples of how common pipes, tubes and fittings are joined together

Presenting/Reporting
- ☐ demonstrates effective use of one or more communication media:

  e.g., Written: *spelling, punctuation, grammar basic format*

  Oral: *voice projection, body language*

  Audio-visual: *techniques, tools*
- ☐ maintains acceptable grammatical and technical standards through proofreading and editing
- ☐ provides an introduction that describes the purpose and scope of the project
- ☐ communicates ideas into a logical sequence with sufficient supporting detail
- ☐ provides a reference list that includes two or more relevant information sources

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Preparation and Planning	4 3 2 1 0	2	
Content	4 3 2 1 0	1	
Presenting/ Reporting	4 3 2 1 0	2	

ACTIVITY ASSESSMENT: INSTALLING A PLUMBING FIXTURE

Plumbing Systems: CON2080–2

Module Learner Expectations

The student will:

- create a drawing of a water supply, drainage, waste and vent system for a typical plumbing fixture
- apply plumbing skills to assist in the installation of a water supply, waste and vent system

Standard

Performance rating of 2 for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Planning and Management

- ☐ prepares self for task
- ☐ organizes and works in an orderly manner
- ☐ interprets and carries out instructions accurately
- ☐ plans and uses time effectively
- ☐ uses standard symbols and drawing techniques
- ☐ clearly identifies components and piping materials

Construction Techniques

- ☐ roughs in plumbing according to plan
- ☐ tests system for leaks
- ☐ installs fixtures according to manufacturer's recommendations

Use of Equipment and Materials

- ☐ selects and uses appropriate equipment/materials safely
- ☐ uses proper personal protective equipment
- ☐ follows proper lifting and handling procedures
- ☐ calculates and measures accurately
- ☐ minimizes waste of materials
- ☐ recognizes and controls potential health and safety hazards

Teamwork

- ☐ cooperates with group members
- ☐ shares work appropriately among group members
- ☐ negotiates solutions to problems

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Planning and Management	4 3 2 1 0	2	
Construction Techniques	4 3 2 1 0	2	
Use of Equipment and Materials	4 3 2 1 0	2	
Teamwork	4 3 2 1 0	2	

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RESEARCH PROCESS: CAREER OPPORTUNITIES IN PLUMBING — Plumbing Systems: CON2080–3

Module Learner Expectation

The student will:

- profile a trade or occupation within the plumbing field

Standard

Performance rating of 2 for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Preparation and Planning
☐ sets goals and establishes steps to achieve them
☐ creates and adheres to timelines
☐ uses personal initiative to formulate questions and find answers
☐ plans and uses time effectively

Information Gathering and Processing
☐ accesses a range of relevant school/community information resources
☐ uses a range of information-gathering techniques
☐ interprets, organizes and combines information into a logical sequence
☐ determines accuracy/currency/reliability of information sources

Content
☐ identifies one or more occupation or trade related to plumbing
☐ lists day-to-day duties of a worker or trades person
☐ describes overall working conditions
☐ assesses local employment opportunities
☐ identifies training programs and entry requirements

Information Sharing
☐ demonstrates effective use of two or more communication media:
e.g., written, oral, audio-visual
☐ communicates ideas in a logical sequence with sufficient supporting detail
☐ maintains acceptable grammatical and technical standards
☐ cites one or more basic information sources

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Preparation and Planning	4 3 2 1 0	2	
Information Gathering and Processing	4 3 2 1 0	2	
Content	4 3 2 1 0	2	
Information Sharing	4 3 2 1 0	2	

RESPONSE ASSESSMENT: HEATING, VENTILATING AND COOLING SYSTEMS

Module Learner Expectation

The student will:

- list and describe the major components of a typical heating, ventilating and air conditioning system

Standard

Response rating of 2

Rating Scale

The student:

4 independently makes explanations and critical judgements based on a superior knowledge base and understanding of content and related issues.

3 makes explanation and comparisons of content using precise terminology. Requires little or no prompting.

2 applies knowledge of content to different situations using accurate terminology. May require some prompting.

1 uses simple recall to demonstrate basic knowledge and understanding of content. May require frequent prompting.

0 is unable to provide a suitable response at this time.

Sample Item(s)	Sample Response(s)
1. Given a drawing or picture of a HVAC system, identify and describe the purpose of each of the following components: – furnace / boiler / heat pump – humidifier – air conditioner – kitchen or bathroom vent.	– a furnace provides heat by burning gas, liquid or solid fuel such as a natural gas, oil or coal. – to maintain the same level of relative humidity in a home, moisture is added to the heated air in a humidifier. – an air conditioner cools the air and reduces the humidity. – a bathroom or kitchen vent exhausts air directly outside using a fan.
2. Explain the difference between a radial and trunk branch heating or air conditioning system.	A radial system radiates out from a central point, whereas a trunk branch system branches off where needed from a horizontal air duct.

For additional items and responses refer to:

- *Construction Technology*. Mark W. Huth, 1966. Text and Instructor's Manual
- *Illustrated Residential and Commercial Construction*. Peter A. Mann, 1989.

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ACTIVITY ASSESSMENT: MAINTAINING/INSTALLING A HVAC SYSTEM

Climate Control System: CON2090–2

Module Learner Expectations

The student will:

- prepare a preventive maintenance schedule for a heating, ventilating and/or air conditioning system
- service or install a heating, ventilating and/or air conditioning system

Standard

Performance rating of 2 for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Planning and Management

☐ prepares self for task
☐ organizes and works in an orderly manner
☐ interprets and carries out instructions accurately
☐ plans and uses time effectively

Construction Techniques

☐ lists components/parts to be serviced according to manufacturer's recommendations
☐ identifies frequency of service and procedures
☐ services a system component according to the prescribed schedule and procedure

Use of Equipment and Materials

☐ selects and uses appropriate equipment/materials safely
☐ uses proper personal protective equipment
☐ follows proper lifting and handling procedures
☐ calculates and measures accurately
☐ minimizes waste of materials
☐ recognizes and controls potential health and safety hazards

Teamwork

☐ cooperates with group members
☐ shares work appropriately among group members
☐ negotiates solutions to problems

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Planning and Management	4 3 2 1 0	2	
Construction Techniques	4 3 2 1 0	2	
Use of Equipment and Materials	4 3 2 1 0	2	
Teamwork	4 3 2 1 0	2	

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RESEARCH PROCESS: CAREER OPPORTUNITIES IN HEATING & AIR CONDITIONING

Climate Control Systems: CON2090–3

Module Learner Expectation

The student will:

- profile a trade or occupation within the heating and air conditioning fields

Standard

Performance rating of 2 for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Preparation and Planning
☐ sets goals and establishes steps to achieve them
☐ creates and adheres to timelines
☐ uses personal initiative to formulate questions and find answers
☐ plans and uses time effectively

Information Gathering and Processing
☐ accesses a range of relevant school/community information resources
☐ uses a range of information-gathering techniques
☐ interprets, organizes and combines information into a logical sequence
☐ determines accuracy/currency/reliability of information sources

Content
☐ identifies one or more occupation or trade related to heating and air conditioning
☐ lists day-to-day duties of a worker or trades person
☐ describes overall working conditions
☐ assesses local employment opportunities
☐ identifies training programs and entry requirements

Information Sharing
☐ demonstrates effective use of two or more communication media:
e.g., written, oral, audio-visual
☐ communicates ideas in a logical sequence with sufficient supporting detail
☐ maintains acceptable grammatical and technical standards
☐ cites one or more basic information sources

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Preparation and Planning	4	3	2	1	0	2	
Information Gathering and Processing	4	3	2	1	0	2	
Content	4	3	2	1	0	2	
Information Sharing	4	3	2	1	0	2	

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PROJECT ASSESSMENT: BUILDING AN AGRI-STRUCTURE **Agri-structures: CON2100–1**

Module Learner Expectations

The student will:

- identify the major issues that must be addressed when designing an agri-structure
- read and interpret the appropriate drawings and specifications to create a material and cost estimate
- construct a structure for use in agriculture

Standard

Performance rating of 2 for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Planning and Management

☐ defines needs considering:
  - human and environmental safety
  - animal comfort and safety and/or crop protection
  - capacity and ease of use
  - construction costs

☐ conducts research to determine potential design
☐ produces a drawing of a suitable design

Construction Techniques

☐ selects and safely uses appropriate tools, materials and processes
☐ calculates and measures accurately
☐ constructs the product according to the design specifications
☐ meets stated standards for:
  - dimensioning
  - squaring
  - assembling
  - finishing

Work Skills

☐ follows instructions with limited direction
☐ organizes work in an orderly manner
☐ works cooperatively with others in both structured and non-structured settings
☐ uses correct personal protective equipment
☐ follows proper lifting and handling procedures
☐ fulfills expected clean-up responsibilities
☐ stores and disposes materials according to recommended procedures

Project Presentation

☐ describes the purpose of the project
☐ summarizes and reports on major events
☐ assesses design processes and production techniques
☐ suggests possible improvements to the design and construction processes

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Planning and Management	4 3 2 1 0	2	
Construction Techniques	4 3 2 1 0	2	
Work Skills	4 3 2 1 0	2	
Project Presentation	4 3 2 1 0	2	

PROJECT ASSESSMENT: PRODUCTS FROM MULTIPLE MATERIALS

Multiple Materials: CON2120–1

Module Learner Expectations

The student will:

- identify advantages of using different material in a product.
- apply knowledge of structural materials, planning and construction techniques to produce a product from different materials.

Standard

Performance rating of 2 for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Planning and Management

☐ defines material requirements in terms of:
  - major properties
  - serviceability
  - ease of construction
  - cost of materials
  - appearance

☐ conducts research to determine potential design
☐ produces a drawing or sketch of a suitable design

Construction Process

☐ constructs the product according to the design specifications
☐ meets stated standards for:
  - dimensioning
  - squaring
  - assembling
  - finishing

Work Skills

☐ follows instructions with limited direction
☐ organizes work in an orderly manner
☐ selects and safely uses appropriate tools, materials and processes
☐ calculates and measures accurately
☐ works cooperatively with others in both structured and non-structured settings
☐ uses correct personal protective equipment
☐ follows proper lifting and handling procedures
☐ fulfills expected clean-up responsibilities
☐ stores and disposes materials according to recommended procedures

Project Presentation

☐ describes the purpose of the project
☐ summarizes and reports on major events
☐ assesses design processes and production techniques
☐ suggests possible improvements to the design and construction processes

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Planning and Management	4	3	2	1	0	2	
Construction Techniques	4	3	2	1	0	2	
Work Skills	4	3	2	1	0	2	
Project Presentation	4	3	2	1	0	2	

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Module Learner Expectations

The student will:

- identify advantages of using different materials in a product
- apply knowledge of structural materials, planning, and construction techniques to produce a product from different materials

Standard

Performance rating of 2 for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals. Analyzes and provides effective client/customer services beyond expectations.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort. Analyzes and provides effective cleint/customer services.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals. Identifies and provides customer/client services.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively. Provides a limited range of customer/client services.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Planning and Management

☐ analyzes an existing piece of furniture or drawing to:
  - identify materials used in structural components
  - identify structural features, such as joints and fasteners
  - examine points of weakness

☐ produces or modifies the appropriate drawings

Construction Techniques

☐ selects and safely uses appropriate tools, materials and processes
☐ calculates and measures accurately
☐ constructs the product according to the design specifications
☐ meets stated standards for:
  - dimensioning
  - squaring
  - assembling
  - finishing

Work Skills

☐ follows instructions with limited direction
☐ organizes work in an orderly manner
☐ works cooperatively with others in both structured and non-structured settings
☐ uses correct personal protective equipment
☐ follows proper lifting and handling procedures
☐ fulfills expected clean-up responsibilities
☐ stores and disposes materials according to recommended procedures

Project Presentation

☐ describes the purpose of the project
☐ summarizes and reports on major events
☐ assesses design processes and production techniques
☐ suggests possible improvements to the design and construction processes

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Planning and Management	4	3	2	1	0	2	
Construction Techniques	4	3	2	1	0	2	
Work Skills	4	3	2	1	0	2	
Project Presentation	4	3	2	1	0	2	

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PROJECT ASSESSMENT: FRAME AND PANEL CONSTRUCTION

Furniture Making 2 (Frame & Panel): CON2140–1

Module Learner Expectations

The student will:

- identify and describe the design features and processes used to construct a box-type furniture product
- apply basic furniture-making skills to plan and construct a component or piece of furniture based on frame and panel construction techniques

Standard

Performance rating of 2 for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Planning and Management

☐ analyzes an existing piece of furniture or drawing to:
  - identify materials used in structural components
  - identify structural features, such as joints and fasteners
  - examine points of weakness

☐ produces or modifies the appropriate drawings

Construction Techniques

☐ constructs the product according to the design specifications

☐ meets stated standards for:
  - dimensioning
  - squaring
  - assembling
  - finishing

Work Skills

☐ follows directions with limited direction

☐ organizes work in an orderly manner

☐ selects and safely uses appropriate tools, materials and processes

☐ calculates and measures accurately

☐ works cooperatively with others in both structured and non-structured settings

☐ uses correct personal protective equipment

☐ follows proper lifting and handling procedures

☐ fulfills expected clean-up responsibilities

☐ stores and disposes of materials according to recommended procedures

Project Presentation

☐ describes the purpose of the project

☐ summarizes and reports on major events

☐ assesses design processes and production techniques

☐ suggests possible improvements to the design and construction processes

☐ identifies skills required of a competent furniture maker

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Planning and Management	4	3	2	1	0	2	
Construction Techniques	4	3	2	1	0	2	
Work Skills	4	3	2	1	0	2	
Project Presentation	4	3	2	1	0	2	

RESPONSE ASSESSMENT: COMMON FINISHES AND FINISHING TECHNIQUES

Module Learner Expectation

The student will:

- identify common finishes and finishing/refinishing techniques

Standard

Response rating of 2

Rating Scale

The student:

4 independently makes explanations and critical judgements based on a superior knowledge base and understanding of content and related issues.

3 makes explanation and comparisons of content using precise terminology. Requires little or no prompting.

2 applies knowledge of content to different situations using accurate terminology. May require some prompting.

1 uses simple recall to demonstrate basic knowledge and understanding of content. May require frequent prompting.

0 is unable to provide a suitable response at this time.

Sample Item(s)	Sample Response(s)
1. List the steps in preparing a surface for finishing.	Surface Preparation: – remove old finish if necessary – remove mill and glue marks – repair dents and wood defects – bleach if necessary – final sand – prime if necessary.
2. What are the steps in applying a finish?	Applying a Finish – select the final finish considering: • planned use of the product • available finishes and equipment – determine if a stain or filler is necessary – clean the surface – follow the prescribed procedure for staining, filling, sealing and final finishing.
3. What types of finishes are commonly used to finish wood products?	Common wood finishes include: – varnish – lacquer – polyurethane – paint – oil.
4. For a controlled product used in finishing, consult the appropriate MSDS to determine the hazards and recommended procedures for using the product.	
5. Explain the reason for disposing used finishing cloths in a covered metal container.	Spontaneous combustion may occur in rags that are stored together in open containers.

For additional items and responses refer to:

- *Exploring Woodworking: Fundamentals of Technology.* Fred W. Zimmerman et. al., 1993. Text and Workbook.

ACTIVITY ASSESSMENT: PRODUCT FINISHING

Finishing and Refinishing: CON2150–2

Module Learner Expectation

The student will:

- demonstrate appropriate refinishing/finishing techniques.

Standard

Performance rating of 2 for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Planning and Management
☐ prepares self for task
☐ organizes and works in an orderly manner
☐ interprets and carries out instructions accurately
☐ plans and uses time effectively

Construction Techniques
☐ prepares surfaces for finish/refinishing as instructed
☐ selects the appropriate stain, filler, sealer and final finish
☐ follows prescribed procedures for finishing
☐ applies finish that is smooth, free of runs and dust particles

Use of Equipment and Materials
☐ selects and uses appropriate equipment/materials safely
☐ uses proper personal protective equipment
☐ follows proper lifting and handling procedures
☐ calculates and measures accurately
☐ minimizes waste of materials
☐ recognizes and controls potential health and safety hazards

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Planning and Management	4 3 2 1 0	2	
Construction Techniques	4 3 2 1 0	2	
Use of Equipment and Materials	4 3 2 1 0	2	

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PROJECT ASSESSMENT: WEB AND FACE FRAME CONSTRUCTION

Cabinetmaking 1 (Web & Face Frame): CON2160–1

Module Learner Expectations

The student will:

- identify and describe the design features and processes used to construct a web and face frame product
- prepare a detailed material list and event sequence
- build a cabinet, using web and face frame construction techniques

Standard

Performance rating of 2 for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Planning and Management
- ☐ analyzes an existing web and face frame product or drawing to:
  - identify materials used in structural components
  - identify structural features, such as joints and fasteners
  - examine points of weakness
  - suggest possible design improvement
- ☐ produces or modifies the appropriate drawings
- ☐ prepares a detailed material list
- ☐ determines an appropriate sequence of events to construct the product in a safe manner

Construction Techniques
- ☐ constructs the product according to the design specifications
- ☐ meets stated standards for:
  - dimensioning
  - squaring
  - assembling
  - finishing

Work Skills
- ☐ follows instructions with limited direction
- ☐ organizes work in an orderly manner
- ☐ selects and safely uses appropriate tools, materials and processes
- ☐ calculates and measures accurately
- ☐ works cooperatively with others in both structured and non-structured settings
- ☐ uses correct personal protective equipment
- ☐ follows proper lifting and handling procedures
- ☐ fulfills expected clean-up responsibilities
- ☐ stores and disposes materials according to recommended procedures

Project Presentation
- ☐ describes the purpose of the project
- ☐ summarizes and reports on major events
- ☐ assesses design processes and production techniques
- ☐ suggests possible improvements to the design and construction processes

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Planning and Management	4	3	2	1	0	2	
Construction Techniques	4	3	2	1	0	2	
Work Skills	4	3	2	1	0	2	
Project Presentation	4	3	2	1	0	2	

PROJECT ASSESSMENT: DOOR AND DRAWER CONSTRUCTION Cabinetmaking 2 (Door & Drawer): CON2170–1

Module Learner Expectations

The student will:

- identify and describe common methods of designing and constructing cabinet doors and drawers
- apply cabinetmaking skills to plan and construct door/drawer components

Standard

Performance rating of 2 for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Planning and Management

- ☐ analyzes existing door and drawer products or drawings to:
  - determine materials used in structural components
  - identify structural features/
  - examine points of weakness
  - describe type of hardware
  - suggest possible design improvements
- ☐ produces or modifies an appropriate drawing for a drawer/door
- ☐ prepares a detailed material list
- ☐ determines an appropriate sequence of events to construct the product in a safe manner

Construction Techniques

- ☐ constructs the product according to the design specifications

Construction Techniques (continued)

- ☐ meets stated standards for:
  - dimensioning
  - squaring
  - assembling
  - finishing

Work Skills

- ☐ follows instructions with limited direction
- ☐ organizes work in an orderly manner
- ☐ selects and safely uses appropriate tools, materials and processes
- ☐ calculates and measures accurately
- ☐ works cooperatively with others in both structured and non-structured settings
- ☐ uses correct personal protective equipment
- ☐ follows proper lifting and handling procedures
- ☐ fulfills expected clean-up responsibilities
- ☐ stores and disposes materials according to recommended procedures

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Planning and Management	4	3	2	1	0	2	
Construction Techniques	4	3	2	1	0	2	
Work Skills	4	3	2	1	0	2	

Module Learner Expectation

The student will:

- profile a trade or occupation within the cabinetmaking field

Standard

Performance rating of 2 for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Preparation and Planning

☐ sets goals and establishes steps to achieve them
☐ creates and adheres to useful timelines
☐ uses personal initiative to formulate questions and find answers
☐ plans and uses time effectively

Information Gathering and Processing

☐ accesses a range of relevant school/community information resources
☐ uses a range of information-gathering techniques
☐ interprets, organizes and combines information into a logical sequence
☐ determines accuracy/currency/reliability of information sources

Content

☐ identifies two or more occupations or trades related to cabinetry
☐ lists day-to-day duties of a worker or trades person
☐ describes overall working conditions
☐ assesses local employment opportunities
☐ identifies training programs and entry requirements

Information Sharing

☐ demonstrates effective use of two or more communication media:
e.g., written, oral, audio-visual
☐ communicates ideas in a logical sequence with sufficient supporting detail
☐ maintains acceptable grammatical and technical standards
☐ cites one or more basic information sources

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Preparation and Planning	4	3	2	1	0	2	
Information Gathering and Processing	4	3	2	1	0	2	
Content	4	3	2	1	0	2	
Information Sharing	4	3	2	1	0	2	

Module Learner Expectation

The student will:

- describe common wood forming techniques

Standard

Response rating of 2

Rating Scale

The student:

4 independently makes explanations and critical judgements based on a superior knowledge base and understanding of content and related issues.

3 makes explanation and comparisons of content using precise terminology. Requires little or no prompting.

2 applies knowledge of content to different situations using accurate terminology. May require some prompting.

1 uses simple recall to demonstrate basic knowledge and understanding of content. May require frequent prompting.

0 is unable to provide a suitable response at this time.

Sample Item(s)	Sample Response(s)
1. List and describe two processes used to condition wood for forming.	Water Soaking: The wood is soaked in water until it reaches a 12–20% water content level. The wood can then be slowly bent and held in shape over a form. Steaming: Wood can also be steamed to cause it to soften (plasticize).
2. Explain how a curved laminate is produced.	Curved laminated parts can be made by gluing several pieces of veneer together. The veneer strips are then clamped in a mold and held in place until the glue sets.

For additional sample items and responses refer to:

- *Cabinetmaking and Millwork.* John L. Feirer, 1988.

Module Learner Expectations

The student will:

- build or obtain the necessary molds and clamping devices to bend a piece of solid stock or wood laminate
- apply wood forming skills and techniques to make a product or component

Standard

Performance rating of 2 for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Planning and Management
☐ defines project and material need
☐ conducts research to determine suitable forming process
☐ produces drawing of formed product and mold

Construction Techniques
☐ prepares the materials for bending following a prescribed set of procedures
☐ builds/selects the appropriate mold
☐ forms product and allows sufficient time for the adhesive to set
☐ trims and finishes the part

Work Skills
☐ follows instructions with limited direction
☐ organizes work in an orderly manner
☐ works cooperatively with others in both structured and non-structured settings
☐ uses tools and materials as directed
☐ minimizes waste of materials uses correct personal protective equipment
☐ follows proper lifting and handling procedures
☐ fulfills expected clean-up responsibilities
☐ stores and disposes materials according to recommended procedures

Project Presentation
☐ describes the purpose of the project
☐ summarizes and reports on major events
☐ assesses design processes and production techniques
☐ suggests possible improvements to the design and production processes

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Planning and Management	4	3	2	1	0	2	
Construction Techniques	4	3	2	1	0	2	
Work Skills	4	3	2	1	0	2	
Project Presentation	4	3	2	1	0	2	

PROJECT ASSESSMENT: BUILDING A PROTOTYPE — Product Development: CON2200–1

Module Learner Expectations

The student will:

- list and describe the steps involved in developing a product for manufacturing
- apply designing and planning skills to assist in the development of a prototype

Standard

Performance rating of 2 for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Planning and Management

☐ defines project outcomes
☐ conducts research pertaining to the selection of ideas from a variety of sources
☐ generates and considers the suitability of a number of solutions to the problem
☐ selects an appropriate solution that meets project requirements
☐ identifies pictorial and multiviewed drawing requirements
☐ produces and accurately dimensions simple pictorial and multiviewed drawings where necessary
☐ uses appropriate drawing tools and/or software

Construction Techniques

☐ uses appropriate tools, materials and processes
☐ measures and fabricates accurately
☐ constructs the prototype according to the design specifications
☐ alters design according to market feedback
☐ alters production methods to maximize efficiency

Work Skills

☐ follows instructions with limited direction
☐ organizes work in an orderly manner
☐ works cooperatively with others in both structured and non-structured settings
☐ uses correct personal protective equipment
☐ follows proper lifting and handling procedures
☐ fulfills expected clean-up responsibilities
☐ stores and disposes materials according to recommended procedures

Project Presentation

☐ describes the purpose of the project
☐ summarizes and reports on major events
☐ assesses design processes and production techniques
☐ suggests possible improvements to the design and construction processes

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Planning and Management	4 3 2 1 0	2	
Construction Techniques	4 3 2 1 0	2	
Work Skills	4 3 2 1 0	2	
Project Presentation	4 3 2 1 0	2	

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ILLUSTRATIVE EXAMPLE: PRODUCT APPRAISAL — Product Development: CON 2200–2

ASSESSMENT CRITERIA	RATING			
	Very Good 3	Good 2	Fair 1	Poor 0
Design Criteria:				
– meets the design specifications	☐	☐	☐	☐
– is convenient to use/clean/service	☐	☐	☐	☐
– is safe to use and be disposed of	☐	☐	☐	☐
– can be recycled.	☐	☐	☐	☐
Production Criteria:				
– uses appropriate materials	☐	☐	☐	☐
– components can be easily fabricated	☐	☐	☐	☐
– can be easily assembled and finished	☐	☐	☐	☐
– meets high standards of quality.	☐	☐	☐	☐
Marketing Criteria				
– appeals to potential customers	☐	☐	☐	☐
– meets customer demand	☐	☐	☐	☐
– is profitable	☐	☐	☐	☐
– can be serviced within and existing network.	☐	☐	☐	☐
REFLECTIONS/COMMENTS	Product has high potential for success....... 30–36 Product has good potential for success...... 24–29 Product has low potential for success........ 12–23			

RESEARCH PROCESS: CONCRETE FORMING, PLACING AND FINISHING

Concrete Work (Structures & Finishes): CON3010–1

Module Learner Expectations

The student will:

- identify and describe concrete forming, placing and finishing techniques
- create a profile of a trade or occupation within the field of concrete work

Standard

Performance rating of 3 or as stated for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals. Analyzes and provides effective client/customer services beyond expectations.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort. Analyzes and provides effective client/customer services.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals. Identifies and provides customer/client services.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively. Provides a limited range of customer/client services.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Preparation and Planning

☐ sets goals and establishes steps to achieve them
☐ creates and adheres to useful timelines
☐ uses personal initiative to formulate questions and find answers
☐ plans and uses time effectively, prioritizing tasks on a consistent basis

Information Gathering and Processing

☐ accesses a range of relevant information sources and recognizes when additional information is required
☐ demonstrates resourcefulness in collecting data
☐ interprets, organizes and combines information in creative and thoughtful ways
☐ records information accurately with appropriate supporting detail and using correct technical terms

Content

☐ investigates common forming and reinforcing techniques
☐ examines the effects of the pressure of concrete on form work
☐ explains the effect aggregate cement and water ratios have on the quality and strength of concrete

Content (continued)

☐ lists and describes common tools and procedures used in placing, consolidating and finishing a concrete structure
☐ identifies working conditions associated with concrete work
☐ determines employment opportunities
☐ identifies post-secondary training institutions and entry requirements
☐ investigates opportunities for a career advancement and self-employment

Collaboration and Teamwork

☐ cooperates with group members
☐ shares work appropriately among group members
☐ negotiates solutions to problems with sensitivity

Information Sharing

☐ demonstrates effective use of two or more communication media:
e.g., written, oral, audio-visual
☐ communicates thoughts/feelings/ideas clearly to justify or challenge a position
☐ maintains acceptable grammatical and technical standards
☐ cites two or more relevant information sources

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Preparation and Planning	4 3 2 1 0	3	
Information Gathering and Processing	4 3 2 1 0	3	
Content	4 3 2 1 0	2	
Collaboration and Teamwork	4 3 2 1 0	3	
Information Sharing	4 3 2 1 0	3	

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RESEARCH PROCESS: MASONRY MATERIALS AND FINISHES

Masonry Work (Structures & Finishes): CON3020–1

Module Learner Expectations

The student will:

- identify and describe common types of masonry materials and finishes
- create a profile of a trade or occupation within the field of masonry work

Standard

Performance rating of 3 or as stated for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals. Analyzes and provides effective client/customer services beyond expectations.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort. Analyzes and provides effective client/customer services.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals. Identifies and provides customer/client services.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively. Provides a limited range of customer/client services.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Preparation and Planning
- ☐ sets goals and establishes steps to achieve them
- ☐ creates and adheres to useful timelines
- ☐ uses personal initiative to formulate questions and find answers
- ☐ plans and uses time effectively, prioritizing tasks on a consistent basis

Information Gathering and Processing
- ☐ accesses a range of relevant information sources and recognizes when additional information is required
- ☐ demonstrates resourcefulness in collecting data
- ☐ interprets, organizes and combines information in creative and thoughtful ways
- ☐ records information accurately with appropriate supporting detail and using correct technical terms

Content
- ☐ describes and gives examples of masonry materials that are used in structural and facing applications
- ☐ explains how one or more masonry material is manufactured, applied/installed and finished

Content (continued)
- ☐ determines employment opportunities related to masonry work
- ☐ identifies working conditions
- ☐ identifies post-secondary training institutions and training requirements
- ☐ investigates opportunities for career advancement and self-employment

Collaboration and Teamwork
- ☐ cooperates with group members
- ☐ shares work appropriately among group members
- ☐ negotiates solutions to problems with sensitivity

Information Sharing
- ☐ demonstrates effective use of two or more communication media:
  e.g., written, oral, audio-visual
- ☐ communicates thoughts/feelings/ideas clearly to justify or challenge a position
- ☐ maintains acceptable grammatical and technical standards
- ☐ cites two or more relevant information sources

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Preparation and Planning	4 3 2 1 0	3	
Information Gathering and Processing	4 3 2 1 0	3	
Content	4 3 2 1 0	2	
Collaboration and Teamwork	4 3 2 1 0	3	
Information Sharing	4 3 2 1 0	3	

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Module Learner Expectations

The student will:

- describe the procedures related to the installation of insulation and vapour barrier to an exterior wall and ceiling
- identify and describe the health hazards and safety precautions associated with the use of insulating, drywalling and finishing materials

Standard

Response rating of 3

Rating Scale

The student:

4 independently makes explanations and critical judgements based on a superior knowledge base and understanding of content and related issues.

3 makes explanation and comparisons of content using precise terminology. Requires little or no prompting.

2 applies knowledge of content to different situations using accurate terminology. May require some prompting.

1 uses simple recall to demonstrate basic knowledge and understanding of content. May require frequent prompting.

0 is unable to provide a suitable response at this time.

Sample Item(s)	Sample Response(s)
1. What is the preferred thickness for polyethylene used as a vapour barrier?	6 mil is preferred although 4 mil is allowed. 6 mil is less likely to suffer damage during construction.
2. Which side of the insulation should be vapour barrier be installed.	On the warm side so that moisture will not build up inside the wall
3. Besides resistance to heat transfer, what other qualities should a good insulation have?	A good insulating material should be vermin proof, fire proof, moisture proof and resistant to physical change.
4. When rafters are used, what special care must be taken when insulating the ceiling at the wall line?	The insulation must be carried over the wall plate but not allowed to obstruct the throat opening.
5. Identify and provide an application for each of the three types of gypsum wall board materials.	Moisture Resistant used for shower walls and other wet areas Fire Guard used wherever a fire hazard exists such as behind a stove or furnace or above heat vent pipes. Standard For ordinary partitions where no special circumstances exist.
6. What are the health hazards associated with drywall and insulating materials?	Steps should be taken to protect one's self from breathing dust from drywall materials and fine insulation particles.

For additional items and questions refer to:

- *Modern Carpentry*. William H. Wagner et. al., 1996.

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ACTIVITY ASSESSMENT: INSTALLING AND FINISHING DRYWALL

Wall & Ceiling Finishing: CON3030–2

Module Learner Expectation

The student will:

- prepare, apply and finish a wall and ceiling surface

Standard

Performance rating of 3 or as stated for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals. Analyzes and provides effective client/customer services beyond expectations.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort. Analyzes and provides effective client/customer services.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals. Identifies and provides customer/client services.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively. Provides a limited range of customer/client services.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Planning and Management

☐ prepares self for task
☐ organizes and works in an orderly manner
☐ interprets and carries out instructions accurately
☐ plans and uses time in a logical sequence
☐ maintains a clean work area
☐ displays leadership in adhering to routine procedures
☐ attempts to solve problems prior to requesting help

Construction Techniques

☐ installs insulation, vapour barrier and drywall according to code
☐ tapes, fills and sands to the prescribed standard
☐ seals, paints and/or applies a wall covering

Use of Equipment and Materials

☐ selects and uses appropriate equipment/materials in a safe and efficient manner
☐ models the correct use of personal protective equipment (PPE)
☐ makes accurate calculations and measurements
☐ observes proper lifting and handling techniques
☐ fulfills expected clean-up and tool maintenance responsibilities
☐ identifies and corrects potential health and safety hazards

Teamwork

☐ cooperates with group members
☐ shares work appropriately among group members
☐ negotiates solutions to problems with sensitivity
☐ displays effective communication skills

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Planning and Management	4 3 2 1 0	3	
Construction Techniques	4 3 2 1 0	2	
Use of Equipment and Materials	4 3 2 1 0	3	
Teamwork	4 3 2 1 0	3	

RESEARCH PROCESS: STAIR CONSTRUCTION

Stair Construction: CON3040–1

Module Learner Expectations

The student will:

- identify and describe different stair types, component parts and construction techniques
- interpret building code regulations pertaining to residential stair design

Standard

Performance rating of 3 or as stated for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals. Analyzes and provides effective client/customer services beyond expectations.*

3 meets defined outcomes. Plans and solves problems in a self directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort. Analyzes and provides effective client/customer services.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals. Identifies and provides customer/client services.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively. Provides a limited range of customer/client services.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Preparation and Planning

☐ sets goals and establishes steps to achieve them
☐ creates and adheres to useful timelines
☐ uses personal initiative to formulate questions and find answers
☐ plans and uses time effectively, prioritizing tasks on a consistent basis

Information Gathering and Processing

☐ accesses a range of relevant information sources and recognizes when additional information is required
☐ demonstrates resourcefulness in collecting data
☐ interprets, organizes and combines information in creative and thoughtful ways
☐ records information accurately with appropriate supporting detail and using correct technical terms

Content

☐ investigates and describes four stair types; e.g.,
  - straight run
  - "L" shaped
  - "U" shaped
  - circular stair

Content (continued)

☐ identifies and describes four common stringer types and application of each; e.g.,
  - housed
  - semi-housed
  - cut out
  - stringer and cleat

☐ determines the specific code regulations for the minimum headroom, rise, run and railing specifications for a given stair
☐ identify five different stair components

Collaboration and Teamwork

☐ cooperates with group members
☐ shares work appropriately among group members
☐ negotiates solutions to problems with sensitivity

Information Sharing

☐ demonstrates effective use of two or more communication media
e.g., written, oral, audio-visual
☐ communicates thoughts/feelings/ideas clearly to justify or challenge a position
☐ maintains acceptable grammatical and technical standards
☐ cites two or more relevant information sources

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Preparation and Planning	4 3 2 1 0	3	
Information Gathering and Processing	4 3 2 1 0	3	
Content	4 3 2 1 0	2	
Collaboration and Teamwork	4 3 2 1 0	3	
Information Sharing	4 3 2 1 0	2	

ACTIVITY ASSESSMENT: STAIR CONSTRUCTION

Stair Construction: CON3040–2

Module Learner Expectation

The student will:

- design, lay out and construct a straight flight of stairs

Standard

Performance rating of 3 or as stated for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals. Analyzes and provides effective client/customer services beyond expectations.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort. Analyzes and provides effective client/customer services.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals. Identifies and provides customer/client services.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively. Provides a limited range of customer/client services.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Planning and Management

☐ prepares self for task
☐ organizes and works in an orderly manner
☐ interprets and carries out instructions accurately
☐ plans and uses time in a logical sequence
☐ maintains a clean work area
☐ displays leadership in adhering to routine procedures
☐ attempts to solve problems prior to requesting help

Construction Techniques

☐ builds or prefabricates an actual or model set of stairs according to the prescribed standard
☐ prepares a stair plan by determining:
  - type of stair
  - specifications; e.g., unit rise and run
  - finish details

Use of Equipment and Materials

☐ selects and uses appropriate equipment/materials in a safe and efficient manner
☐ models the correct use of personal protective equipment (PPE)
☐ makes accurate calculations and measurements
☐ observes proper lifting and handling techniques
☐ fulfills clean-up and tool maintenance responsibilities
☐ identifies and corrects potential health and safety hazards

Teamwork

☐ cooperates with group members
☐ shares work appropriately among group members
☐ negotiates solutions to problems with sensitivity
☐ displays effective communication skills

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Planning and Management	4	3	2	1	0	3	
Construction Techniques	4	3	2	1	0	2	
Use of Equipment and Materials	4	3	2	1	0	3	
Teamwork	4	3	2	1	0	3	

RESEARCH PROCESS: RAFTER CONSTRUCTION — Roof Structures 2 (Framing & Covering): CON3050–1

Module Learner Expectations

The student will:

- identify and describe the design features of intersecting sloped roofs
- calculate the length of rafters, using ratio and proportion techniques

Standard

Performance rating of 3 for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals. Analyzes and provides effective client/customer services beyond expectations.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort. Analyzes and provides effective client/customer services.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals. Identifies and provides customer/client services.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively. Provides a limited range of customer/client services.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Preparation and Planning

☐ sets goals and establishes steps to achieve them
☐ creates and adheres to useful timelines
☐ uses personal initiative to formulate questions and find answers
☐ plans and uses time effectively, prioritizing tasks on a consistent basis

Information Gathering and Processing

☐ accesses a range of relevant information sources and recognizes when additional information is required
☐ demonstrates resourcefulness in collecting data
☐ interprets, organizes and combines information in creative and thoughtful ways
☐ records information accurately with appropriate supporting detail and using correct technical terms

Content

☐ investigates and describes the principal design features of an intersecting roof

Content (continued)

☐ describes the features and cuts required to make a:
  - common rafter
  - hip and valley rafter
  - hip and valley jack rafter

☐ from a set of drawings, determines
  - roof slope
  - amount of overhang
  - length of a hip, valley and related jack rafter

Collaboration and Teamwork

☐ cooperates with group members
☐ shares work appropriately among group members
☐ negotiates solutions to problems with sensitivity

Information Sharing

☐ demonstrates effective use of two or more communication media:
e.g., written, oral, audio-visual
☐ communicates thoughts/feelings/ideas clearly to justify or challenge a position
☐ maintains acceptable grammatical and technical standards
☐ cites two or more relevant information sources

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Preparation and Planning	4 3 2 1 0	3	
Information Gathering and Processing	4 3 2 1 0	3	
Content	4 3 2 1 0	3	
Collaboration and Teamwork	4 3 2 1 0	3	
Information Sharing	4 3 2 1 0	3	

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ACTIVITY ASSESSMENT: RAFTER CUTTING AND ASSEMBLY

Roof Structures 2 (Framing & Covering): CON3050–2

Module Learner Expectation

The student will:

- lay out, cut and assemble a set of rafters for a roof assembly

Standard

Performance rating of 3 for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals. Analyzes and provides effective client/customer services beyond expectations.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort. Analyzes and provides effective client/customer services.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals. Identifies and provides customer/client services.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively. Provides a limited range of customer/client services.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Planning and Management
☐ prepares self for task
☐ organizes and works in an orderly manner
☐ interprets and carries out instructions accurately
☐ plans and uses time in a logical sequence
☐ maintains a clean work area
☐ displays leadership in adhering to routine procedures
☐ attempts to solve problems prior to requesting help

Construction Techniques
☐ prepares a pattern from a given set of drawings
☐ cuts the appropriate number of rafters according to the prescribed pattern
☐ assemble rafters according to plan

Use of Equipment and Materials
☐ selects and uses appropriate equipment/materials in a safe and efficient manner
☐ models the correct use of personal protective equipment (PPE)
☐ makes accurate calculations and measurements
☐ observes proper lifting and handling techniques
☐ fulfills clean-up and tool maintenance responsibilities
☐ identifies and corrects potential health and safety hazards

Teamwork
☐ cooperates with group members
☐ shares work appropriately among group members
☐ negotiates solutions to problems with sensitivity
☐ displays effective communication skills

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Planning and Management	4 3 2 1 0	3	
Construction Techniques	4 3 2 1 0	3	
Use of Equipment and Materials	4 3 2 1 0	3	
Project Presentation	4 3 2 1 0	3	

Module Learner Expectations

The student will:

- identify common types of doors, hardware and trim products
- create a profile of a trade or occupation within the finish carpentry field

Standard

Performance rating of 3 or as stated for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals. Analyzes and provides effective client/customer services beyond expectations.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort. Analyzes and provides effective client/customer services.*

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1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively. Provides a limited range of customer/client services.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Preparation and Planning

☐ sets goals and establishes steps to achieve them
☐ creates and adheres to useful timelines
☐ uses personal initiative to formulate questions and find answers
☐ plans and uses time effectively, prioritizing tasks on a consistent basis

Information Gathering and Processing

☐ accesses a range of relevant information sources and recognizes when additional information is required
☐ demonstrates resourcefulness in collecting data
☐ interprets, organizes and combines information in creative and thoughtful ways
☐ records information accurately with appropriate supporting detail and using correct technical terms

Content

☐ lists and describes the common interior doors found in residential construction
☐ explains how one determines whether a door has a right hand or left hand swing
☐ investigates and describes the principal types of trim used in residential construction

Content (continued)

☐ identifies the common wood joints used when installing trim products
☐ provides a diagram of a passage door lock and labels its parts
☐ describes a trade or related occupation
☐ investigates the career opportunities and training requirements for a finish carpenter

Collaboration and Teamwork

☐ cooperates with group members
☐ shares work appropriately among group members
☐ negotiates solutions to problems with sensitivity

Information Sharing

☐ demonstrates effective use of two or more communication media
e.g., written, oral, audio-visual
☐ communicates thoughts/feelings/ideas clearly to justify or challenge a position
☐ maintains acceptable grammatical and technical standards
☐ cites two or more relevant information sources

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Preparation and Planning	4 3 2 1 0	3	
Information Gathering and Processing	4 3 2 1 0	3	
Content	4 3 2 1 0	2	
Collaboration and Teamwork	4 3 2 1 0	3	
Information Sharing	4 3 2 1 0	3	

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RESEARCH PROCESS: INSTALLING FLOOR COVERINGS

Floorcovering: CON3070–1

Module Learner Expectations

The student will:

- identify and describe common types of residential, institutional and commercial floor coverings
- create a profile of a trade or occupation within the floor covering field

Standard

Performance rating of 3 or as stated for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals. Analyzes and provides effective client/customer services beyond expectations.*

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0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Preparation and Planning

☐ sets goals and establishes steps to achieve them
☐ creates and adheres to useful timelines
☐ uses personal initiative to formulate questions and find answers
☐ plans and uses time effectively, prioritizing tasks on a consistent basis

Information Gathering and Processing

☐ accesses a range of relevant information sources and recognizes when additional information is required
☐ demonstrates resourcefulness in collecting data
☐ interprets, organizes and combines information in creative and thoughtful ways
☐ records information accurately with appropriate supporting detail and using correct technical terms

Content

☐ investigates and describes four common floor covering materials
☐ outlines the factors to consider when choosing a floor covering

Content (continued)

☐ explains how the sub-floor is prepared and techniques used to install one or more flooring product
☐ determines employment opportunities related to marketing and installing flooring products
☐ lists day-to-day activities and working conditions of one or more jobs
☐ investigates training opportunities

Collaboration and Teamwork

☐ cooperates with group members
☐ shares work appropriately among group members
☐ negotiates solutions to problems with sensitivity

Information Sharing

☐ demonstrates effective use of two or more communication media:
e.g., written, oral, audio-visual
☐ communicates thoughts/feelings/ideas clearly to justify or challenge a position
☐ maintains acceptable grammatical and technical standards
☐ cites two or more relevant information sources

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Preparation and Planning	4 3 2 1 0	3	
Information Gathering and Processing	4 3 2 1 0	3	
Content	4 3 2 1 0	2	
Collaboration and Teamwork	4 3 2 1 0	3	
Information Sharing	4 3 2 1 0	3	

PRESENTATIONS/REPORTS: BUILDING RENOVATION/RESTORATION PROJECT **Renovations/Restorations: CON3090-1**

Module Learner Expectation

The student will:

- complete a feasibility study and cost estimate of a renovation/restoration project

Standard

Performance rating of 3 or as stated for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals. Analyzes and provides effective client/customer services beyond expectations.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort. Analyzes and provides effective client/customer services.*

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0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student

Preparation and Planning

☐ sets goals and describes steps to achieve them
☐ uses personal initiative to formulate questions and find answers
☐ accesses a range of relevant information sources and recognizes when additional information is required
☐ interprets, organizes and combines information in creative and thoughtful ways
☐ records information accurately with appropriate technical terms and supporting detail
☐ plans and uses time effectively, prioritizing tasks on a consistent basis

Content

☐ determines and states the needs of the client
☐ investigates and describes the condition and age of the original structure
☐ identifies sources of information regarding construction techniques and materials used in older buildings

Content (continued)

☐ identifies local regulations and code requirements related to renovation/restorations projects
☐ completes a plan and cost estimate

Presenting/Reporting

☐ demonstrates effective use of one or more communication media:
e.g., Written: *spelling, punctuation, grammar basic format*
Oral: *voice projection, body language*
Audio-visual: *techniques, tools, clarity, speed and pacing*
☐ maintains acceptable grammatical and technical standards through proofreading and editing
☐ provides an introduction that describes the purpose and scope of the project
☐ communicates thoughts/feelings/ideas clearly to justify or challenge a position
☐ gives evidence of adequate research through a reference list

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Preparation and Planning	4 3 2 1 0	3	
Content	4 3 2 1 0	2	
Presenting/ Reporting	4 3 2 1 0	3	

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RESEARCH PROCESS: MANAGEMENT PRINCIPLES AND PRACTICES — Site Management: CON3110–1

Module Learner Expectation

The student will:

- identify and describe the key elements of project management related to commercial and residential construction
- outline the roles and responsibilities of the principal players on a construction project
- apply site management theories and practices to create a management plan for a construction project

Standard

Performance rating of 3 or as stated for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals. Analyzes and provides effective client/customer services beyond expectations.*

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0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE APPRAISAL

The student:

Preparation and Planning

☐ sets clear goals and establishes steps to achieve them
☐ creates and adheres to detailed timelines
☐ uses personal initiative to formulate questions and find answers
☐ plans and uses time effectively, prioritizing tasks on a consistent basis

Information Gathering and Processing

☐ accesses a range of relevant information sources and recognizes when additional information is required
☐ demonstrates resourcefulness in collecting data
☐ interprets, organizes and combines information in creative and thoughtful ways
☐ records information accurately with appropriate supporting detail and using correct technical terms

Content

☐ identifies and describes principal tasks related to the following management phases:
- planning
- scheduling
- implementing
- controlling

Content (continued)

☐ provides accurate descriptions of the role and responsibilities of a project manager in relation to other key players
☐ outlines and compares two different scheduling techniques used on construction projects
☐ creates a work schedule

Collaboration and Teamwork

☐ cooperates with group members
☐ shares work appropriately among group members
☐ negotiates solutions to problems with sensitivity
☐ displays effective communication and leadership skills

Information Sharing

☐ demonstrates effective use of a variety of communication media:
e.g., written, oral, audio-visual
☐ communicates thoughts/feelings/ideas clearly to justify or challenge a position
☐ maintains acceptable grammatical and technical standards
☐ gives evidence of adequate information gathering by citing relevant information sources

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Preparation and Planning	4 3 2 1 0	3	
Information Gathering and Processing	4 3 2 1 0	3	
Content	4 3 2 1 0	2	
Collaboration and Teamwork	4 3 2 1 0	3	
Information Sharing	4 3 2 1 0	3	

PROJECT ASSESSMENT: LEG-AND-RAIL CONSTRUCTION

Furniture Making 3 (Leg & Rail): CON3130–1

Module Learner Expectations

The student will:

- identify and describe the design and joinery features of a typical leg-and-rail piece of furniture
- apply drawing and estimating skills to prepare a shop drawing, a detailed material list and cost estimate
- plan and build a piece of furniture using leg-and-rail construction techniques

Standard

Performance rating of 3 for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals. Analyzes and provides effective client/customer services beyond expectations.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort. Analyzes and provides effective client/customer services.*

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1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively. Provides a limited range of customer/client services.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Planning and Management

☐ analyzes an existing leg-and-rail product or drawing to:
  - determine materials used in structural components
  - identify and describe structural features
  - predict points of weakness
  - identify and describe hardware requirements
  - suggest possible design improvements

☐ produces or modifies an appropriate set of drawings for a leg-and-rail product based on research and client need

☐ prepares a detailed list of materials and cost estimate

Construction Techniques

☐ identifies preferred tool requirements

☐ calculates and measures accurately to minimize costs

☐ constructs the product according to the design specifications

☐ is sensitive to a variety of feedback mechanisms and alters plans accordingly

Construction Techniques (continued)

☐ meets stated standards for:
  - dimensioning
  - squaring
  - assembling
  - finishing

Work Skills

☐ accurately follows instructions

☐ creates and adheres to detailed timeline; makes efficient use of time

☐ works cooperatively with others, shares work appropriately among group members and negotiates with sensitivity, solutions to problem

☐ fulfills clean-up and tool maintenance responsibilities

☐ establishes and follows personal and environmental health and safety procedures

☐ determines recommended health and safety practices to store and/or dispose of materials

Project Presentation

☐ describes the purpose and scope of the project

☐ summarizes and reports on major events

☐ assesses design processes and construction techniques

☐ makes recommendations to improve product quality and productivity

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Planning and Management	4 3 2 1 0	3	
Construction Techniques	4 3 2 1 0	3	
Work Skills	4 3 2 1 0	3	
Project Presentation	4 3 2 1 0	3	

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RESPONSE ASSESSMENT: SURFACE ENHANCEMENTS

Furniture Making 4 (Surface Enhancement): CON3140–1

Module Learner Expectations

The student will:

- identify and describe common methods of matching wood veneer
- differentiate between inlay, marquetry and carving techniques

Standard

Response rating of 3

Rating Scale

The student:

4 independently makes explanations and critical judgements based on a superior knowledge base and understanding of content and related issues.

3 makes explanation and comparisons of content using precise terminology. Requires little or no prompting.

2 applies knowledge of content to different situations using accurate terminology. May require some prompting.

1 uses simple recall to demonstrate basic knowledge and understanding of content. May require frequent prompting.

0 is unable to provide a suitable response at this time.

Sample Item(s)	**Sample Response(s)**
1. From pictures or drawings of veneer matching techniques, identify and describe the following: • book • slip • diamond • checker board.	
2. Explain how a diamond match is prepared.	If a diamond match is required, the four pieces of veneer are cut on an angle from the same piece stripped grain veneer.
3. List and describe three different furniture enhancement techniques.	Inlay An inlay pattern is achieved when a thin strip of a rare wood is set into the surface of solid wood or other veneer. Marquetry Marquetry is the technique that is used to produce a design or picture from a variety of different veneers. Carving Ornamental designs on wood products are cut into the wood surface using special hand tools and/or power tools.

For additional sample items and responses refer to:

- *Cabinetmaking and Millwork*. John L. Feirer, 1988.

PROJECT ASSESSMENT: REPAIRING/RESTORING FURNITURE

Furniture Repair: CON3150–1

Module Learner Expectations

The student will:

- assess the condition of a piece of furniture to determine whether it can be economically repaired or restored
- prepare a repair/restoration plan and cost estimate
- repair/restore a piece of furniture

Standard

Performance rating of 3 for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals. Analyzes and provides effective client/customer services beyond expectations.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort. Analyzes and provides effective client/customer services.*

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0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Planning and Management

☐ analyzes an existing piece of furniture to:
  - determine materials and finishes
  - identify structural features
  - predict areas of weakness and/or disrepair

☐ estimates the cost of repair from the analysis

☐ develops a repair/restoration plan that:
  - identifies materials and tools required
  - specialized skills required
  - sequence of events to be followed

Repair Processes

☐ identifies preferred tool requirements

☐ disassembles and removes old glue and finish

☐ repairs surfaces or joints

☐ reassembles using appropriate fasteners and adhesives

☐ finishes to meet or exceed the original standard

Work Skills

☐ accurately follows instructions

☐ creates and adheres to detailed timeline; makes efficient use of time

☐ works cooperatively with others, shares work appropriately among group members and negotiates with sensitivity, solutions to problem

☐ fulfills clean-up and tool maintenance responsibilities

☐ establishes and follows personal and environmental health and safety procedures

☐ determines recommended health and safety practices to store and/or dispose of materials

Project Presentation

☐ describes the purpose and scope of the project

☐ summarizes and reports on major events

☐ assesses design processes and construction techniques

☐ makes recommendations to improve product quality and productivity

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Planning and Management	4 3 2 1 0	3	
Construction Techniques	4 3 2 1 0	3	
Work Skills	4 3 2 1 0	3	
Project Presentation	4 3 2 1 0	3	

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Assessment Tools

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PRESENTATIONS/REPORTS: CABINET/COUNTERTOPS AND EDGE TREATMENTS

Cabinetmaking 3 (Cabinets/Countertops): CON3160–1

Module Learner Expectations

The student will:

- identify and describe common types of cabinet/countertops and installation procedures.
- identify and describe a suitable edge treatment for a given application

Standard

Performance rating of 3 for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals. Analyzes and provides effective client/customer services beyond expectations.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort. Analyzes and provides effective client/customer services.*

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0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student

Preparation and Planning

- ☐ sets goals and describes steps to achieve them
- ☐ uses personal initiative to formulate questions and find answers
- ☐ accesses a range of relevant information sources and recognizes when additional information is required
- ☐ interprets, organizes and combines information in creative and thoughtful ways
- ☐ records information accurately with appropriate technical terms and supporting detail
- ☐ plans and uses time effectively, prioritizing tasks on a consistent basis

Content

- ☐ describes current cabinet/counter top materials used in cabinet making and residential construction
- ☐ illustrates methods used to achieve an appropriate edge treatment
- ☐ identifies various adhesives and safe methods of handling and storage

Content (continued)

- ☐ identifies and describes common techniques used to attach counter tops with an emphasis on fastener concealment
- ☐ produces two sample counter top surfaces and edge treatment

Presenting/Reporting

- ☐ demonstrates effective use of one or more communication media:

  e.g., *__Written__: spelling, punctuation, grammar basic format*

  __Oral__ voice projection, body language

  __Audio-visual__ techniques, tools, clarity, speed and pacing
- ☐ maintains acceptable grammatical and technical standards through proofreading and editing
- ☐ provides an introduction that describes the purpose and scope of the project
- ☐ communicates thoughts/feelings/ideas clearly to justify or challenge a position
- ☐ gives evidence of adequate research through a reference list

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Preparation and Planning	4	3	2	1	0	3	
Content	4	3	2	1	0	3	
Presenting/ Reporting	4	3	2	1	0	3	

Module Learner Expectations

The student will:

- identify the characteristics of an efficient production system
- analyze a product to determine the necessary production processes and tools
- create a production flow chart and/or facility layout

Standard

Performance rating of 3 or as stated for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals. Analyzes and provides effective client/customer services beyond expectations.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort. Analyzes and provides effective client/customer services.*

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TASK PERFORMANCE CRITERIA

The student

Preparation and Planning

☐ sets goals and describes steps to achieve them
☐ uses personal initiative to formulate questions and find answers
☐ accesses a range of relevant information sources and recognizes when additional information is required
☐ interprets, organizes and combines information in creative and thoughtful ways
☐ records information accurately with appropriate technical terms and supporting detail
☐ plans and uses time effectively, prioritizing tasks on a consistent basis

Content

☐ provides examples of efficient production systems
☐ links production efficiency to time, material and cost savings
☐ identifies inefficiencies related to:
  - poor inventory control
  - poor quality control
  - line breakdown
  - facility layout
  - working conditions

Content (continued)

☐ lists and describes processes required to produce a given product
☐ organizes production flow charts
☐ evaluates it on the basis of:
  - visible bottle necks
  - need to back track
  - material and product flow

Presenting/Reporting

☐ demonstrates effective use of one or more communication media:
e.g., Written: *spelling, punctuation, grammar basic format*
Oral *voice projection, body language*
Audio-visual *techniques, tools, clarity, speed and pacing*
☐ maintains acceptable grammatical and technical standards through proofreading and editing
☐ provides an introduction that describes the purpose and scope of the project
☐ communicates thoughts/feelings/ideas clearly to justify or challenge a position
☐ gives evidence of adequate research through a reference list

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Preparation and Planning	4	3	2	1	0	3	
Content	4	3	2	1	0	2	
Presenting/ Reporting	4	3	2	1	0	3	

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PRESENTATIONS/REPORTS: QUALITY MANAGEMENT

Production Management: CON3200–1

Module Learner Expectations

The student will:

- describe effective production management strategies
- develop a system to manage and schedule work and to control materials and completed products
- use effective management skills to operate an efficient production system

Standard

Performance rating of 3 or as stated for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals. Analyzes and provides effective client/customer services beyond expectations.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort. Analyzes and provides effective client/customer services.*

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0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student

Preparation and Planning

☐ sets goals and describes steps to achieve them
☐ uses personal initiative to formulate questions and find answers
☐ accesses a range of relevant information sources and recognizes when additional information is required
☐ interprets, organizes and combines information in creative and thoughtful ways
☐ records information accurately with appropriate technical terms and supporting detail
☐ plans and uses time effectively, prioritizing tasks on a consistent basis

Content

☐ outlines principles of a quality management system
☐ describes role of customers, employees and managers in developing a quality system
☐ discusses the role of collaboration and teamwork to improve quality
☐ identifies and describes organizational systems such as a "PERT" chart

Content (continued)

☐ designs and implements a plan to:
- schedule work
- distribute materials
- store/distribute products

☐ keeps records of a production run
☐ describes methods to improve management skills

Presenting/Reporting

☐ demonstrates effective use of one or more communication media:

e.g., ***Written:*** *spelling, punctuation, grammar basic format*
Oral: *voice projection, body language*
Audio-visual: *techniques, tools, clarity, speed and pacing*

☐ maintains acceptable grammatical and technical standards through proofreading and editing
☐ provides an introduction that describes the purpose and scope of the project
☐ communicates thoughts/feelings/ideas clearly to justify or challenge a position
☐ gives evidence of adequate research through a reference list

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING					STANDARD	COMMENTS
Preparation and Planning	4	3	2	1	0	1	
Content	4	3	2	1	0	1	
Presenting/ Reporting	4	3	2	1	0	1	

Module Learner Expectation

The student will:

- compare conventional and engineered framing systems and components

Standard:

Response rating of 3

Rating Scale

The student:

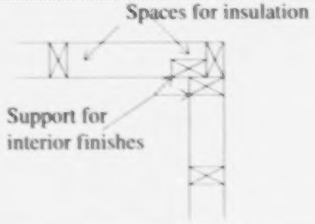
4 independently makes explanations and critical judgements based on a superior knowledge base and understanding of content and related issues.

3 makes explanation and comparisons of content using precise terminology. Requires little or no prompting.

2 applies knowledge of content to different situations using accurate terminology. May require some prompting.

1 uses simple recall to demonstrate basic knowledge and understanding of content. May require frequent prompting.

0 is unable to provide a suitable response at this time.

Sample Item(s)	Sample Response(s)
1. Most framed structures have some form of bracing to provide restraint from lateral forces. Describe one or more techniques that may be used where non-structural materials are used as sheathing.	Bracing can be achieved by let-in bracing where the outside faces are notched at each corner to receive a 1" x 4" board at a 45° angle set flush with each stud face *or* By fitting 2" lumber between each stud at an angle of 45° at each corner *or* Applying galvanized steel T-bracing at a 45° angle to the outside faces of the studs at each corner.
2. Compare the advantages of open and solid web trusses over conventional floor and ceiling framing techniques.	Open Web: • provides for long, clear spans • lighter and straighter than solid lumber • reduces transmission of sound • no cutting required to install plumbing, heating and electrical system Solid Web • not prone to shrink • lighter and straighter than solid lumber • wider nailing and bearing surfaces • ductwork, pipes and wire can pass through web.
3. Draw a typical corner configuration in stud framing that provides support for interior finishes and the greatest amount of protection from heat loss.	

For additional items and responses refer to:

- *Modern Carpentry*. William H. Wagner et. al., 1966.

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CONSTRUCTION ACTIVITY: FRAMING

Framing Systems 2 (Floor, Wall & Ceiling): CON3210–2

Module Learner Expectations

The student will:

- apply print-reading and estimating principles to prepare a material list and cost estimate for a structure that incorporates conventional and/or engineered framing components
- demonstrate advanced framing layout and assembly skills

Standard:

Performance rating of 3 for each applicable task

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards.*

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent.*

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent.*

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent.*

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

TASK PERFORMANCE CRITERIA

The student:

Planning and Management

☐ prepares self for task
☐ organizes and works in an orderly manner
☐ interprets and carries out instructions accurately
☐ plans and uses time efficiently
☐ displays leadership in adhering to routine procedures
☐ attempts to solve problems prior to requesting help
☐ interprets floor, wall and ceiling prints
☐ accurately prepares a material list and cost estimate

Construction Technique

☐ cuts and lays out components according to plan
☐ assembles and fastens components in keeping with accepted framing practice
☐ accurately measures squares and levels components

Use of Equipment and Materials

☐ selects and uses appropriate equipment/materials in a safe and efficient manner
☐ models the correct use of PPE
☐ makes accurate calculations and measurements
☐ uses materials efficiently
☐ observes proper lifting and handling techniques
☐ fulfills clean-up and tool maintenance responsibilities
☐ identifies and corrects potential health and safety hazards

Teamwork

☐ demonstrates leadership skills
☐ cooperates with group members
☐ shares work appropriately among group members
☐ negotiates solutions to problems with sensitivity
☐ displays effective communication skills

PERFORMANCE ASSESSMENT

CRITERIA	STUDENT RATING	STANDARD	COMMENTS
Planning and Management	4 3 2 1 0	3	
Construction Techniques	4 3 2 1 0	3	
Use of Equipment and Materials	4 3 2 1 0	3	
Teamwork	4 3 2 1 0	3	

EQUIPMENT CHECKLIST: DRILL PRESS

CONEQUIP–1

STANDARD: all procedures to be performed correctly.

Name: ______________________

Date: ______________________

* SET-UP PROCEDURES

The student:

- ☐ operates the equipment only with the teacher's permission
- ☐ removes/confines loose apparel and long hair
- ☐ wears the proper personal protective equipment
- ☐ selects and mounts the proper drill bit or accessory
- ☐ removes the key from the chuck
- ☐ adjusts the machine to the correct speed
- ☐ checks the condition and position of all guards
- ☐ mounts the work securely in the proper vise or clamp
- ☐ adjusts the depth stop to the correct depth
- ☐ centres punches metal parts prior to drilling
- ☐ checks drill bit for straightness
- ☐ positions the work piece.

* OPERATING PROCEDURES

The student:

- ☐ checks drill bit alignment and depth of cut
- ☐ applies even pressure when drilling
- ☐ raises the drill bit occasionally to clear cuttings
- ☐ uses cutting fluids if necessary
- ☐ drills a pilot hole for larger holes
- ☐ uses a V-block to hold round stock
- ☐ removes cuttings with a brush
- ☐ keeps floor free from scrap materials.

* SHUT-DOWN PROCEDURES

The student:

- ☐ removes and carefully stores work pieces
- ☐ returns tools and accessories to their proper location
- ☐ cleans the equipment and work area
- ☐ returns equipment to original state.

*** Procedures may differ according to each manufacturer's recommendations.**

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EQUIPMENT CHECKLIST: BANDSAW **CONEQUIP-2**

STANDARD: all procedures to be performed correctly.

Name: ____________________

Date: ____________________

* SET-UP PROCEDURES

The student:

☐ requests permission to use equipment before work begins
☐ removes/confines loose apparel and long hair
☐ wears the proper personal protective equipment
☐ checks the condition of the blade and blade guides
☐ adjusts blade guides to the correct height – 3 mm or 1/8" – above work.

* OPERATING PROCEDURES

The student:

☐ guides the work slowly; does not force the work
☐ avoids backing out from cuts other than making relief cuts
☐ does not attempt to cut smaller radius than the blade will allow
☐ uses V block to cut cylindrical stock
☐ does not place fingers or hands in line with the blade
☐ uses a push stick where necessary
☐ applies brake to stop blade
☐ allows the machine to come to a complete stop when removing the work piece, cleaning or making adjustments
☐ maintains a 100 mm margin of safety between fingers and blade.

* SHUT-DOWN PROCEDURES

The student:

☐ returns tools and accessories to their proper location
☐ cleans up equipment and work area
☐ lowers blade guard to table.

*** Procedures may differ according to each manufacturer's recommendations.**

EQUIPMENT CHECKLIST: WOOD LATHE

Turning Operations: CONEQUIP-3

STANDARD: all procedures to be performed correctly.

Name: ______________________

Date: ______________________

* SET-UP PROCEDURES

The student:

- ☐ requests permission to use equipment before work begins
- ☐ removes/confines loose apparel and long hair
- ☐ wears the proper personal protective equipment
- ☐ makes sure all guards are in place and operating correctly
- ☐ securely mounts work between centres or to the face plate
- ☐ adjusts tool rest to the correct height and distance from the work piece
- ☐ adjusts equipment to operate at the correct speed
- ☐ makes provision for dust control
- ☐ checks stock for balance and soundness.

* OPERATING PROCEDURES

The student:

- ☐ rotates spindle by hand to check clearance before starting
- ☐ stands to one side when starting the lathe
- ☐ selects the appropriate cutting tools
- ☐ holds the cutting tools securely and at the proper angles to the work
- ☐ frequently readjusts tool rest to maintain correct speed and distance to work piece
- ☐ allows work piece to fully stop before adjusting the tool rest or measuring the work piece
- ☐ removes tool rest before sanding.

* SHUT-DOWN PROCEDURES

The student:

- ☐ removes and carefully stores work piece
- ☐ returns tools and accessories to their proper location
- ☐ cleans up equipment and the work area
- ☐ returns adjustments to original state.

*** Procedures may differ according to each manufacturer's recommendations.**

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EQUIPMENT CHECKLIST: TABLE SAW

CONEQUIP–4

STANDARD: all procedures to be performed correctly.

Name: ______________________

Date: ______________________

✱ SET-UP PROCEDURES

The student:

☐ requests permission to use equipment before work begins
☐ removes/confines loose apparel and long hair
☐ wears the proper personal protective equipment
☐ makes sure power supply to the saw is off before changing blade configuration
☐ checks/installs proper blade
☐ sets blade to proper height – 3 mm or 1/8" above the work piece
☐ adjusts fence and/or miter gauge
☐ checks to see that all guards and other safety devices are in place and functioning.

✱ OPERATING PROCEDURES

The student:

☐ uses rip fence for ripping and miter gauge for crosscutting
☐ uses a push stick when hands come within 150 mm or 6" of the blade
☐ stands to one side of the blade
☐ measures off the blade only after it has come to a complete stop
☐ allows the blade to come to a complete stop before waste stock is removed from the table
☐ keeps floor free from scrap materials.

✱ SHUT-DOWN PROCEDURES

The student:

☐ returns tools and accessories to their proper location
☐ cleans up equipment and work area
☐ lowers blade and returns the miter gauge and blade to 90°.

✱ Procedures may differ according to each manufacturer's recommendations.

EQUIPMENT CHECKLIST: SURFACE PLANER CONEQUIP–5

STANDARD: all procedures to be performed correctly.

Name: ____________________

Date: ____________________

• SET-UP PROCEDURES

The student:

- ☐ requests permission to use equipment before work begins
- ☐ removes/confines loose apparel and long hair
- ☐ wears the proper personal protective equipment
- ☐ clears the table of any scraps
- ☐ sees that the work piece is free of loose knots, nails, dirt and finish materials
- ☐ determines grain and feed direction
- ☐ adjusts depth of cut, normal 2mm or 1/16".

• OPERATING PROCEDURES

The student:

- ☐ planes in the direction of the grain
- ☐ does not plane stock less that 300 mm or 12" long, or less that 6 mm or 1/4" thick.
- ☐ uses a follower stick if required for short stock
- ☐ stands to one side of the stock when planing
- ☐ shuts power off before attempting to remove stock that has become stuck
- ☐ keeps area around equipment free of scrap.

• SHUT-DOWN PROCEDURES

The student:

- ☐ cleans up equipment and work area
- ☐ returns adjustments to original state.

• Procedures may differ according to each manufacturer's recommendations.

EQUIPMENT CHECKLIST: JOINTER **CONEQUIP–6**

STANDARD: all procedures to be performed correctly.

Name: ____________________

Date: ____________________

● SET-UP PROCEDURES

The student:

☐ requests permission to use equipment before work begins
☐ removes/confines loose apparel and long hair
☐ wears the proper personal protective equipment
☐ checks all adjustments and control locks with power off
☐ checks condition and operation of guards
☐ determines condition of material direction of grain
☐ adjusts depth of cut to 2 mm to 3 mm or 1/16" to 1/8".

● OPERATING PROCEDURES

The student:

☐ joints in direction of grain
☐ does not joint stock less that 300 mm or 12" in length and 12 mm or 1/2" in thickness
☐ uses push block for flat work
☐ keeps fingers and hands away from cutting knives
☐ keeps area clean and floor free of scrap materials.

● SHUT-DOWN PROCEDURES

The student:

☐ makes sure the machine has come to a complete stop prior to cleaning
☐ returns adjustments to original state.

● Procedures may differ according to each manufacturer's recommendations.

CONSTRUCTION TECHNOLOGIES

SECTION H: LINKAGES/TRANSITIONS

This section of the Guide has been designed to provide an overview of linkages and transitions of CTS modules with a number of organizations. The charts and information presented in this section will assist CTS students and teachers in understanding the potential application of CTS modules as students move into the workplace.

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LINKAGES/TRANSITIONS

There are many opportunities for students in Construction Technologies to build linkages among CTS strands and across other subject areas, including core and complementary programs. In addition to making linkages across the curriculum, making connections between what students have already learned in other settings (e.g., home, community and workplace) can also be achieved through this strand.

LINKAGES

With Basic Competencies

The Construction Technologies strand supports the development and integration of the basic competencies related to personal and resource management, problem solving, safe work practices and social interactions throughout the introductory, intermediate and advanced modules. It is important that students develop these competencies because success in the workplace often depends more on these skills than on many of the technical or academic skills they possess.

With Other CTS Strands

Construction Technologies complements modules from a number of other strands, e.g., Agriculture, Communication Technology, Design Studies, Enterprise and Innovation, Fabrication Studies, Forestry and Logistics.

Specific linkages that may be of interest to students in Construction Technologies include:

Strand	Module	Linkage
Agriculture	AGR2050 Agrifoods 1	Construction of structures used in processing and storage of agriculture products, livestock and equipment.
Career Transitions	Project Modules	Provide opportunity and direction for students involved in projects beyond the expectations of a given Construction Technologies module.
	Practicum Modules	Provide opportunity for students to work towards an externally developed and recognized credential related to the strand.
Design Studies	DES1010 Sketch, Draw & Model	Can be offered in conjunction with a student project and design module.
	DES2050 Technical Drawing Applications	Used in the context of house design and residential systems.
Enterprise and Innovation	ENT1020 Planning a Venture	Used in conjunction with manufacturing and production modules.
Fabrication Studies	FAB2010 Structural Engineering	Studied in the context of concrete work and framing techniques.
Forestry	FOR2070 Harvest Practices	Forest products used in construction.
Logistics	LOG1040 Purchasing 1	Used in conjunction with purchasing materials for project work.

It is important to note that project, practicum and safety modules from the Career Transitions strand may be combined with modules from the Construction Technologies strand to provide increased opportunity for students to develop expertise and refine their competencies in a particular area of study, such as:

- acquiring safety skills and credentials
- completing a larger more complex project
- enhancing specific carpenter, cabinetmaking or other trade skills
- expanding a module topic or theme.

Examples of CTR project modules that have been developed as extension to existing modules are shown in this section.

Linkages between Construction Technologies modules and other strands and across the curriculum have also been identified. Refer to "Construction Technologies: Connections With Other CTS Strands" and "Construction Technologies Connections Across the Curriculum."

In addition, modules may be aligned according to the course emphasis and themes that run between modules and strands as outlined in "Construction Technologies: Junior High School Module Clusters" and "Construction Technologies: Senior High School Module Clusters."

For a summary of modules that can be combined with Construction Technologies from other strands, refer to "Construction Technologies: Extended Scope and Sequence."

With Elementary Programs

The development of concepts related to Construction Technologies can begin as early as ECS using hand tool activities and teaching strategies similar to those outlined in the "Integrated Practical Activities for Elementary Grades," Alberta Education, 1980.

With Other Secondary Programs

To help make learning more authentic and significant, it is important to integrate the core and complementary areas with Construction Technologies whenever possible. By being aware of and supporting the content of other curricula promotes relevance and reinforces core and complementary courses outlined in the following chart.

Subject	Linkage
Language Arts	Technical report writing, task analysis, event scheduling and oral and multimedia presentations.
Mathematics	Measurement, calculation of area and volume, use of fractions, ratios, geometry and trigonometry.
Science	Material properties, structures, chemical safety, use of simple machines and electricity as well as related environmental concerns.
Social Studies	Economics, impact of technology on society, resource development and industrial relationships.
CALM	Career assessment and preparation.
Art	Wood carving, picture framing, inlaying and marquetry.
Drama	Stage prop construction and set design.

With Practical Arts Courses

As of September 1997, modules in the Construction Technologies strand replaced many of the existing practical arts junior and senior high programs. A detailed correlation of the Construction Technologies strand modules to the related practical arts courses can be found in this section (see "Construction Technologies: Correlations to Junior/Senior High School Practical Arts Courses").

TRANSITIONS

To the Community/Workplace

Competencies developed in Construction Technologies provide students with many of the entry level skills required in the workplace (see "Construction Technologies: Module Relationships to Specific Trades and Occupations."

The National Occupational Classification (NOC) shown in chart form in this section indicates occupations for which Construction Technologies provides a foundation (see "Construction Technologies: Related Occupations"). According to this chart, high school students could potentially move into nine occupations requiring high school education and 21 trades related to Construction Technologies.

To Related Post-secondary Programs

The themes and modules offered in Construction Technologies are consistent with many of the pre-employment and apprenticeship courses now being offered by post-secondary institutions.

A number of articulation agreements have been established with post-secondary institutions in Alberta. These agreements provide preferred entrance and/or advanced standing/credit for CTS students who have successfully completed designated modules. A current summary of articulation agreements in place that involve CTS modules is available through Alberta Education's web site at <http://ednet.edc.gov.ab.ca>. For further information regarding particular articulation agreements, contact the post-secondary institution and/or review its calendar.

CTS courses in Construction Technologies may also link with one or more of Alberta's Apprenticeship Training Programs; e.g., Carpenter, Cabinetmaker. Students who are employed as an apprentice in one of these trade areas and have successfully completed designated CTS modules may also qualify, upon the recommendation of their employer, for a portion of the in-school training component. A summary of articulation agreements established for specific apprenticeship trades (including a correlation to CTS modules) is available through Alberta Education's web site. Further information regarding apprenticeship linkages can be obtained by contacting Alberta Advanced Education and Career Development, Apprenticeship and Industry Training Division.

An outline of post-secondary institutions in Alberta currently offering programs related to Construction Technologies is in "Construction Technologies: Summary of Related Post-secondary Programs."

CREDENTIALLING

Students may earn partial or complete credentials recognized in the workplace and/or post-secondary institutions by demonstrating specified competencies within the CTS curriculum. The Construction Technologies strand, in conjunction with modules from the Career Transitions strand, provides opportunities for students to develop competencies related to:

- Explosive Actuated Tools
- Construction Safety Training
- Emergency First Aid
- Workplace Hazardous Materials Information System
- Transportation of Dangerous Goods.

Further information regarding credentialling in Construction Technologies is provided in "Credentialling Opportunities in Construction Technologies" and the *Career & Technology Studies Manual for Administrators, Counsellors and Teachers*, Appendix 14.

MODULE CTR2110: PROJECT 2A – CONCRETE FORMING

Level: Intermediate

Theme: Career Extensions

Prerequisite: CON2020 Concrete Forming

Module Parameters: Access to a building site and instruction from an individual with specialized training in concrete forming and placing

Students extend and enhance competencies related to form construction and concrete placement.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• propose, manage and assess a project • meet goals as defined within the project plan	• successful completion of project, including project: – proposal – management – completion – assessment – presentation. *Assessment Tool* *CTR Project: Career Extensions Modules*	 20 20 20 20 20
• demonstrate basic competencies.	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

MODULE CTR2110: PROJECT 2A: CONCRETE FORMING (continued)

Concept	Specific Learner Expectations	Notes★
Project Definition	*The student should:* • identify a project • outline related issues and implications • prepare a project plan: – clarify the purposes of the project – define project deliverables – specify project timelines; e.g., key decision points, consultation points – define resource needs; e.g., materials, costs, support network • identify and comply with all related health and safety standards • define assessment standards (indicators for success) • present project proposal and obtain necessary approvals.	Have student identify the type and amount of form work to be completed. Discuss the need for an event sequence and cost estimate for the form work and concrete placement being undertaken. Standards should be consistent with those held by the trades.
Project Management	• proceed with the project as outlined by the project plan • monitor project and make necessary adjustments to project plan.	Project monitoring should include regular progress checks and consultation with teacher and others.
Project Presentation and Assessment	• present the project: – outcomes attained – relationship to goals set originally • assess the project: – processes and strategies used – recommendations for how the project could have been improved.	Project presentation could be in print, a display of the project or a description of the processes undertaken. Student assessment could be print, verbal and/or audio-visual.

★ *Refer to the Guide to Standards and Implementation for a particular strand for suggestions about how project modules could be used to complement and enhance the learning.*

MODULE CTR2120: PROJECT 2B – EXTERIOR WALL AND EAVE FINISHING

Level: Intermediate

Theme: Career Extensions

Prerequisite: CON2060 Exterior Finishing

Module Parameters: Access to a building site and instruction from an individual with specialized training in exterior finishing.

Students extend and enhance competencies related to the installation of finishing materials on exterior walls and roof projections.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• propose, manage and assess a project • meet goals as defined within the project plan	• successful completion of the project including project:	
	– proposal	20
	– management	20
	– completion	20
	– assessment	20
	– presentation.	20
	Assessment Tool *Career Extension (Project)* *Modular Assessment Tool (CTR Project)*	
• demonstrate effort to develop basic competencies.	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

MODULE CTR2120: PROJECT 2B: EXTERIOR WALL AND EAVE FINISHING (continued)

Concept	Specific Learner Expectations	Notes ★
Project Definition	*The student should:* • identify a project • outline related issues and implications • prepare a project plan: – clarify the purposes of the project – define project deliverables – specify project timelines; e.g., key decision points, consultation points – define resource needs; e.g., materials, costs, support network • identify and comply with all related health and safety standards • define assessment standards (indicators for success) • present project proposal and obtain necessary approvals.	Have student identify the type and amount of finishing materials to be used. Discuss the need for an event sequence and cost estimate to apply a new or replace an old finish. Standards should be consistent with those held by the trades.
Project Management	• proceed with the project as outlined by the project plan • monitor project and make necessary adjustments to project plan.	Project monitoring should include regular progress checks and consultation with teacher and others.
Project Presentation and Assessment	• present the project: – outcomes attained – relationship to goals set originally • assess the project: – processes and strategies used – recommendations for how the project could have been improved.	Project presentation could be in print, a display of the project or a description of the processes undertaken. Student assessment could be print, verbal and/or audio-visual.

★ *Refer to the Guide to Standards and Implementation for a particular strand for suggestions about how project modules could be used to complement and enhance the learning.*

LINKAGES – *Construction Technologies: Connections With Other CTS Strands*

Construction Technologies Modules	Agriculture	Career Transitions	Communication Technology	Community Health	Cosmetology Studies	Design Studies	Electro Technologies	Energy and Mines	Enterprise and Innovation	Fabrication Studies	Fashion Studies	Financial Management	Foods	Forestry	Information Processing	Legal Studies	Logistics	Management and Marketing	Mechanics	Tourism Studies	Wildlife
Theme: Building Systems (Processes and Applications)																					
CON1010: Basic Tools & Materials		▤				▤				■				▤					▤		
CON1070: Building Construction	▤	▤					▤														
CON2010: Site Preparation	▤	▤																			
CON2020: Concrete Forming		▤																			
CON2030: Alternate Foundations		▤																			
CON2040: Framing Systems 1 (Floor &Wall)		▤																			
CON2050: Roof Structures 1 (Framing and Finishing)		▤																			
CON2060: Exterior Finishing (Door, Window & Siding)		▤																			
CON2070: Electrical Systems		▤					■														
CON2080: Plumbing Systems		▤																			
CON2090: Climate Control Systems	■	▤																			
CON2100: Agri-structures	■	▤																			
CON3010: Concrete Work (Structures & Finishes)		▤																			
CON3020: Masonry Work (Structures & Finishes)		▤																			
CON3030: Wall & Ceiling Finishing		▤																			
CON3040: Stair Construction		▤																			
CON3050: Roof Structures 2 (Framing & Covering)		▤																			
CON3060: Doors & Trim		▤																			
CON3070: Floorcovering		▤																			
CON3080: Energy-efficient Housing		▤				▤		▤													
CON3090: Renovations/Restorations		▤																			
CON3100: Commercial Structures		▤																			
CON3110: Site Management		▤																			
Theme: Manufacturing Systems (Processes and Applications)																					
CON1120: Project Management		▤				■						▤									
CON1130: Solid Stock Construction		▤				▤								▤							
CON1140: Turning Operations		▤				▤															
CON1160: Manufactured Materials		▤				▤								▤							
CON1180: Mold Making & Casting		▤				▤															
CON2120: Multiple Materials		▤				▤															
CON2130: Furniture Making 1 (Box Construction)		▤				▤															
CON2140: Furniture Making 2 (Frame & Panel)		▤				▤															
CON2150: Finishing & Refinishing		▤				▤															
CON2160: Cabinetmaking 1 (Web & Face Frame)		▤				▤															
CON2170: Cabinetmaking 2 (Door & Drawer)		▤				▤															
CON2180: Wood Forming		▤				▤															
CON2190: Manufacturing Systems		▤																			
CON2200: Product Development		▤				■															
CON3120: Tool Maintenance		▤					▤												▤		
CON3130: Furniture Making 3 (Leg & Rail)		▤				▤															
CON3140: Furniture Making 4 (Surface Enhancement)		▤				▤															
CON3150: Furniture Repair		▤				▤															
CON3160: Cabinetmaking 3 (Cabinets/Countertops)		▤																			
CON3170: Cabinetmaking 4 (Layout & Installation)		▤				▤															
CON3190: Production Planning		▤								▤									▤		
CON3200: Production Management		▤								▤									▤		
CON3210: Framing Systems 2 (Floor, Wall & Ceiling)		▤																			

Other CTS Strands

Provides many direct links with competencies in this strand. Students will reinforce, extend and apply a substantial number of knowledge and/or skill components in practical situations.	■
Provides some links with competencies developed in this strand, usually through the application of related technologies and/or processes.	▤

LINKAGES – *Construction Technologies: Connections Across the Curriculum*

	Across the Curriculum																		
	Junior High							Senior High											
Construction Technologies Modules	Language Arts	Social Studies	Mathematics	Science	Health & PLS	Physical Education	Fine Arts	English	Social Studies	Mathematics	Science (General)	Biology	Chemistry	Physics	CALM	Physical Education	Fine Arts	Social Sciences	Second Language
Theme: Building Systems (Processes and Applications)																			
CON1010: Basic Tools & Materials				▤											▤				
CON1070: Building Construction			▤	▤											▤				
CON2010: Site Preparation										▤					▤				
CON2020: Concrete Forming															▤				
CON2030: Alternate Foundations													▤		▤				
CON2040: Framing Systems 1 (Floor & Wall)										▤					▤				
CON2050: Roof Structures 1 (Framing & Finishing)															▤				
CON2060: Exterior Finishing (Door, Window & Siding)															▤				
CON2070: Electrical Systems										▤	▤			▤	▤				
CON2080: Plumbing Systems										▤	▤			▤	▤				
CON2090: Climate Control Systems										▤	▤			▤	▤				
CON2100: Agri-structures															▤				
CON3010: Concrete Work (Structures & Finishes)															▤				
CON3020: Masonry Work (Structures & Finishes)															▤				
CON3030: Wall & Ceiling Finishing															▤				
CON3040: Stair Construction										▤					▤				
CON3050: Roof Structures 2 (Framing & Covering)										▤					▤				
CON3060: Doors & Trim															▤				
CON3070: Floorcovering															▤				
CON3080: Energy-efficient Housing											▤			▤	▤				
CON3090: Renovations/Restorations															▤				
CON3100: Commercial Structures															▤				
CON3110: Site Management															▤				
Theme: Manufacturing Systems (Processes and Applications)																			
CON1120: Project Management			▤												▤				
CON1130: Solid Stock Construction															▤				
CON1140: Turning Operations															▤				
CON1160: Manufactured Materials															▤				
CON1180: Mold Making & Casting															▤				
CON2120: Multiple Materials															▤				
CON2130: Furniture Making 1 (Box Construction)															▤				
CON2140: Furniture Making 2 (Frame & Panel)															▤				
CON2150: Finishing & Refinishing													▤		▤				
CON2160: Cabinetmaking 1 (Web & Face Frame)															▤				
CON2170: Cabinetmaking 2 (Door & Drawer)															▤				
CON2180: Wood Forming															▤				
CON2190: Manufacturing Systems								▤	▤						▤				
CON2200: Product Development															▤				
CON3120: Tool Maintenance															▤				
CON3130: Furniture Making 3 (Leg & Rail)															▤				
CON3140: Furniture Making 4 (Surface Enhancement)															▤				
CON3150: Furniture Repair															▤		▤		
CON3160: Cabinetmaking 3 (Cabinets/Countertops)															▤				
CON3170: Cabinetmaking 4 (Layout & Installation)															▤				
CON3190: Production Planning															▤				
CON3200: Production Management															▤				
CON3210: Framing Systems 2 (Floor, Wall & Ceiling)										▤					▤				

Provides many direct links with course content. Students will reinforce, extend and apply a substantial number of knowledge and/or skill components in practical contexts.	■
Provides some links with course content, usually through the application of related technologies and/or processes.	▤

LINKAGES – *Construction Technologies: Connections With Other CTS Strands*

LINKAGES - *Construction Technologies: Junior High School Module Clusters*

Course Emphasis	Construction Technologies Modules	Design Studies Modules	Fabrication Studies Modules	Forestry Modules
Production (3 modules)	Basic Tools & Materials (CON1010)		Production Systems (FAB1160)	
	Building Construction (CON1070)			
Planning and Management (4 modules)	Project Management (CON1120)	Sketch, Draw & Model (DES1010)	Basic Tools & Materials (CON1010)	
	Solid Stock Construction (CON1130)			
Carpentry (6 modules)	Building Construction (CON1070)	Sketch, Draw & Model (DES1010)	Basic Tools & Materials (CON1010)	
	Solid Stock Construction (CON1130)			
	Manufactured Materials (CON1160)			
Cabinetry (6 modules)	Project Management (CON1120)	Sketch, Draw & Model (DES1010)	Basic Tools & Materials (CON1010)	Harvest Practices (Fibre Harvesting and Processing) (FOR2070)
	Solid Stock Construction (CON1130)			
	Turning Operations (CON1140)			

LINKAGES - *Construction Technologies: Senior High School Module Clusters*

Introductory Focus

Themes			
Exploration	Basic Tools & Materials (CON1010)	Building Construction (CON1070)	**Production Systems (FAB1160)**
Planning and Management	**Sketch, Draw & Model (DES1010)**	Project Management (CON1120)	Solid Stock Construction (CON1130)
Material Processing	Mold Making & Casting (CON1180)	Manufactured Materials (CON1160)	Fundamentals of Recycling (ENM1090)
Design	**The Design Process (DES1020)**	Turning Operations (CON1140)	Multiple Materials (CON2120)

Intermediate Focus

Tool Processes	Manufactured Materials (CON1160)	Furniture Making 1 (CON2130)	Furniture Making 2 (CON2140)
	Cabinetmaking 1 (CON2160)	Cabinetmaking 2 (CON2170)	
Print Reading and Layout	**2-D Design Applications (DES2010)**	**Print Reading (FAB2020)**	Site Preparation (CON2010)
Structural Design	**Structural Engineering (FAB2010)**	Framing Systems 1 (CON2040)	Roof Structures 1 (CON2050)

Advanced Focus

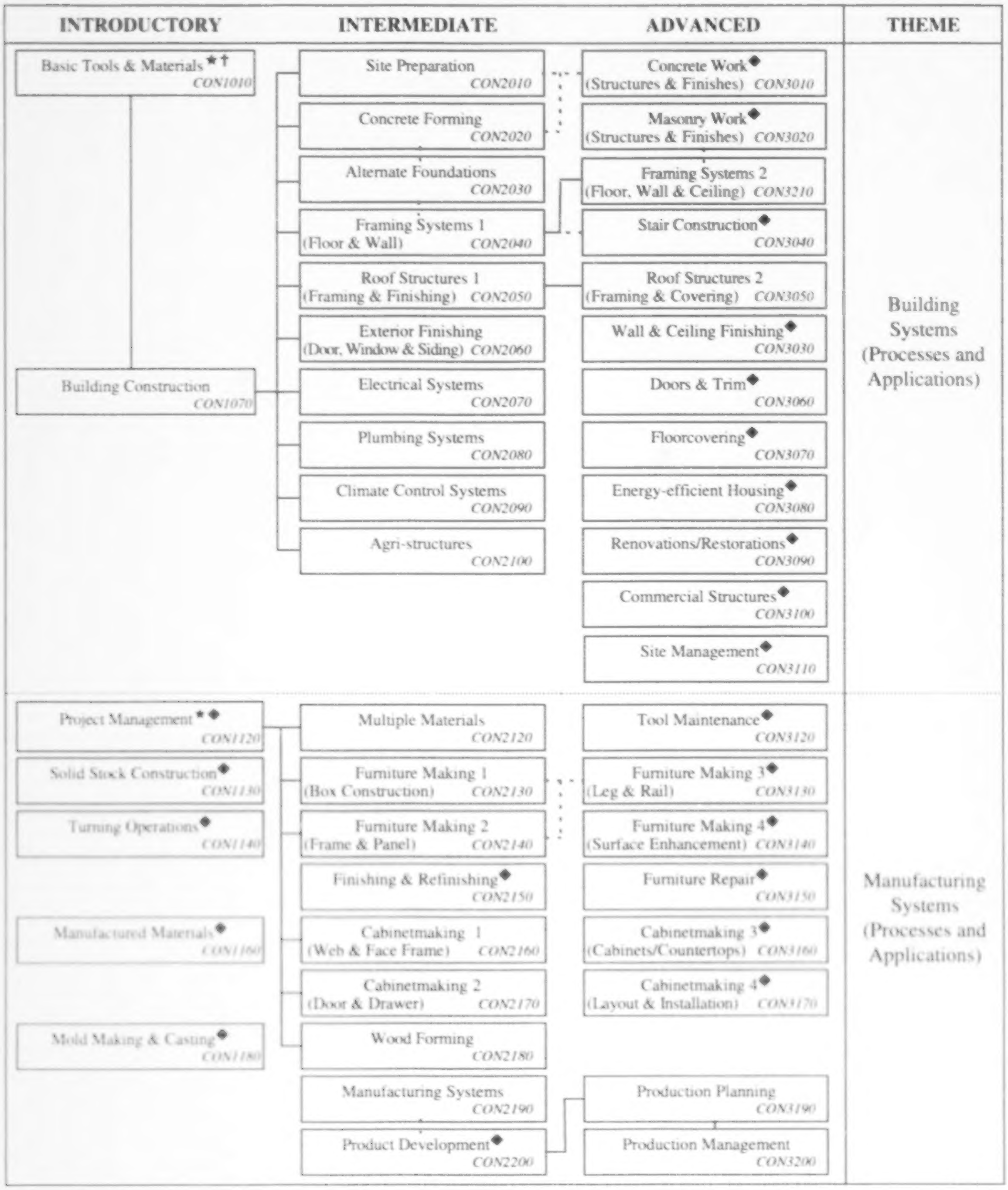
Material Processes	Concrete Work (CON3010)	Masonry Work (CON3020)	Wall & Ceiling Finishing (CON3030)
Interior Finishing	Stair Construction (CON3040)	Doors & Trim (CON3060)	Floor Covering (CON3070)
Energy Efficiency	**Energy Designs/Systems 1 (ENM2090)**	Energy Efficient Housing (CON3080)	Renovations/Restorations (CON3090)
Commercial Construction	Building Construction (CON1070)	Commercial Structures (CON3100)	Site Management (CON3110)
Design	**Draft/Design Applications (DES2040)**	Furniture Making 3 (CON3130)	Renovations/Restorations (CON3090)
Production	Manufacturing Systems (CON2190)	Production Planning (CON3190)	Production Management (CON3200)

▭ Indicates Linking Module.

BEST COPY AVAILABLE

LINKAGES – *Construction Technologies: Connections With Other CTS Strands*

Construction Technologies: *Scope and Sequence*



INTRODUCTORY	INTERMEDIATE	ADVANCED	THEME
Basic Tools & Materials★† CON1010	Site Preparation CON2010	Concrete Work◆ (Structures & Finishes) CON3010	Building Systems (Processes and Applications)
	Concrete Forming CON2020	Masonry Work◆ (Structures & Finishes) CON3020	
	Alternate Foundations CON2030	Framing Systems 2 (Floor, Wall & Ceiling) CON3210	
	Framing Systems 1 (Floor & Wall) CON2040	Stair Construction◆ CON3040	
	Roof Structures 1 (Framing & Finishing) CON2050	Roof Structures 2 (Framing & Covering) CON3050	
	Exterior Finishing (Door, Window & Siding) CON2060	Wall & Ceiling Finishing◆ CON3030	
Building Construction CON1070	Electrical Systems CON2070	Doors & Trim◆ CON3060	
	Plumbing Systems CON2080	Floorcovering◆ CON3070	
	Climate Control Systems CON2090	Energy-efficient Housing◆ CON3080	
	Agri-structures CON2100	Renovations/Restorations◆ CON3090	
		Commercial Structures◆ CON3100	
		Site Management◆ CON3110	
Project Management★◆ CON1120	Multiple Materials CON2120	Tool Maintenance◆ CON3120	Manufacturing Systems (Processes and Applications)
Solid Stock Construction◆ CON1130	Furniture Making 1 (Box Construction) CON2130	Furniture Making 3◆ (Leg & Rail) CON3130	
Turning Operations◆ CON1140	Furniture Making 2 (Frame & Panel) CON2140	Furniture Making 4◆ (Surface Enhancement) CON3140	
	Finishing & Refinishing◆ CON2150	Furniture Repair◆ CON3150	
Manufactured Materials◆ CON1160	Cabinetmaking 1 (Web & Face Frame) CON2160	Cabinetmaking 3◆ (Cabinets/Countertops) CON3160	
	Cabinetmaking 2 (Door & Drawer) CON2170	Cabinetmaking 4◆ (Layout & Installation) CON3170	
Mold Making & Casting◆ CON1180	Wood Forming CON2180		
	Manufacturing Systems CON2190	Production Planning CON3190	
	Product Development◆ CON2200	Production Management CON3200	

——— Prerequisite - - - - Recommended sequence

★ Module provides a strong foundation for further learning in this strand.

† Module is also offered in Fabrication Studies.

◆ Refer to specific modules for additional prerequisites.

LINKAGES – *Construction Technologies: Extended Scope and Sequence*

THEME	INTRODUCTORY	INTERMEDIATE	ADVANCED
Building Systems (Processes and Applications)		Project 2A *CTR2110*	
		Harvest Practices *FOR2070*	Practicum A *CTR3040*
		Structural Engineering *FAB2010*	
	Sketch, Draw & Model *DES1010*	Technical Drawing Applications *DES2050*	Living Environment Studio 2 *DES3080*
		Project 2B *CTR2120*	
		Print Reading *FAB2020*	Info Management Tools *INF3080*
	CAD Fundamentals *DES1050*		
Manufacturing Systems (Processes and Applications)		CAD Applications *DES2030*	
	Fundamentals of Recycling *ENM1090*		
	Production Systems *FAB1160*		3-D Design Studio 3 *DES3060*
	Planning a Venture *ENT1020*	Implementing the Venture *ENT2040*	Managing the Venture *ENT3010*

LINKAGES – *Construction Technologies: Correlations to Junior/Senior High School Practical Arts Courses*★

CTS Construction Modules	CTS1010: Basic Tools & Materials	CON1070: Building Construction	CON1120: Project Management	CON1130: Solid Stock Construction	CON1140: Turning Operations	CON1160: Manufactured Materials	CON1180: Mold Making & Casting	CON2010: Site Preparation	CON2020: Concrete Forming	CON2030: Alternate Foundations	CON2040: Framing Systems 1	CON2050: Roof Structures 1	CON2060: Exterior Finishing	CON2070: Electrical Systems	CON2080: Plumbing Systems	CON2090: Climate Control Systems	CON2100: Agri-structures	CON2120: Multiple Materials	CON2130: Furniture Making 1 CON2140: Furniture Making 2	CON2150: Finishing & Refinishing	CON2160: Cabinetmaking 1 CON2170: Cabinetmaking 2	CON2180: Wood Forming	CON2190: Manufacturing Systems	CON2200: Product Development	CON3010: Concrete Work	CON3020: Masonry Work	CON3210: Framing Systems 2	CON3040: Stair Construction	CON3050: Roof Structures 2	CON3030: Wall & Ceiling Finishing	CON3060: Doors & Trim	CON3070: Floorcovering	CON3080: Energy-efficient Housing	CON3090: Renovations/Restorations	CON3100: Commercial Structures	CON3110: Site Management	CON3120: Tool Maintenance	CON3130: Furniture Making 3 CON3140: Furniture Making 4	CON3150: Furniture Repair	CON3160: Cabinetmaking 3 CON3170: Cabinetmaking 4	CON3190: Production Planning	CON3200: Production Management
Junior High - Materials																																										
Woods	X	X	X	X	X	X	X																																			
Metals	X	X	X				X																																			
Plastics	X		X		X	X	X																																			
Earths	X	X	X				X																																			
Leather/Textiles	X		X																																							
Industrial Simulation	X		X																																							
Materials 10-20-30 (1 credit)																																										
General Woods																		X	X	X	X	X		X													X					
Building Const. (Frame)		X									X	X					X										X										X					
Building Const. (Subtrades)		X						X	X			X	X	X			X								X	X	X										X					
Cabinet Const. (Basic)																			X	X	X																X					
Cabinet Const. (Advanced)																																					X			X	X	
Earths	X						X											X																			X					
Plastics																		X																			X					
Research & Development	X		X																				X	X																		
Production Science	X		X																				X	X													X				X	X
Building Construction 12																		X	X	X	X	X		X													X	X				
Building Construction 22A																			X	X	X			X													X	X				
Building Construction 22B								X	X								X								X	X											X					
Building Construction 22C										X	X	X					X										X										X					
Building Construction 32A												X	X													X			X				X				X					
Building Construction 32B																				X	X									X	X	X					X			X		
Building Construction 32C	Career Transitions																																									
Piping 12		X													X	X																	X	X			X					
Electricity 22B		X												X		X																					X					
Production Science 30																							X	X													X				X	X
Sheet Metal 32A																X																					X					
Related Mechanics 22B										X	X	X															X										X					
Related Mechanics 22C														X																							X					

★ September 1997: All practical arts courses replaced by Career and Technology Studies.

LINKAGES - *Construction Technologies:*
Module Relationships to Specific Trades and Occupations

Introductory, Intermediate and Advanced Modules	Bricklayer	Cabinetmaker	Carpenter	Cement Finisher	Construction Estimator	Electrician	Floor Covering Installer	Lather - Interior	Painter & Decorator	Plasterer	Plumber	Recreation Veh. Maintenance	Residential Bldg. Renovator	Roofer	Saw Filer	Tile Setter	Wood Product Assembler	Woodworking Mach. Operator
Basic Tools & Materials		X	X														X	X
Building Construction			X		X								X					
Project Management	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	
Solid Stock Construction		X	X										X					
Turning Operations		X	X										X					X
Manufactured Materials		X	X														X	X
Mold Making & Casting		X	X	X														
Site Preparation	X		X								X							
Concrete Forming	X		X		X													
Alternate Foundations			X		X													
Framing Systems 1			X		X		X					X						
Roof Structures 1			X									X		X				
Exterior Finishing			X															
Electrical Systems						X						X						
Plumbing Systems											X	X						
Climate Control Systems						X					X	X						
Agri-structures	X		X	X	X	X					X			X				
Multiple Materials		X										X	X					X
Furniture Making 1 and 2		X																X
Finishing & Refinishing		X	X										X				X	
Cabinetmaking 1 and 2		X															X	X
Wood Forming		X	X															
Manufacturing Systems																	X	
Product Development																	X	X
Concrete Work				X														
Masonry Work	X			X														
Framing Systems 2			X		X								X					
Wall & Ceiling Finishing			X						X									
Stair Construction			X															
Roof Structures 2			X											X				
Doors & Trim		X	X														X	
Floorcovering			X				X											
Energy-efficient Housing			X															
Renovations/Restorations	X	X	X	X	X	X	X	X	X	X	X		X	X		X		
Commercial Structures	X	X	X	X	X	X	X	X	X	X	X			X	X	X		
Site Management	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X		
Tool Maintenance		X	X			X									X		X	X
Furniture Making 3 and 4		X															X	X
Furniture Repair		X															X	X
Cabinetmaking 3 and 4		X	X	X									X		X			
Production Planning																	X	X
Production Management																	X	X

TRANSITIONS – *Construction Technologies: Related Occupations*

Information for this chart was obtained from the National Occupational Classification (NOC) descriptions.

Educational Requirements:

D:	High School Education	B:	College or Vocational Education
C:	Apprenticeship	A:	University

Occupation Profile	NOC#	D	C	B	A
Bricklayer	7281		✓		
Cabinetmaker	7272		✓		
Carpenters	7271		✓		
Cement Finisher	7282		✓		
Concrete, Clay and Stone Forming Operators	9419	✓			
Construction Estimator	2234	✓		✓	
Construction Inspector	2264	✓		✓	
Construction Manager	0711	✓		✓	✓
Construction Trade Helpers and Labourers	7611	✓			
Contractors and Supervisors, Carpentry Trades	7215		✓		
Contractors and Supervisors, Heavy Construction Equipment Crews	7217		✓		
Contractors and Supervisors, Other Construction Trades, Installers, Repairers and Services	7219		✓		
Contractors and Supervisors, Pipefitting Trades	7213		✓		
Crane and Hoisting Equipment Operators	7371		✓		
Elevator Constructor	7318		✓		
Floorcovering Installer	7295		✓		
Gasfitter	7253		✓		
Glazier/Glassworker	7292		✓		
Heavy Equipment Operator	7421	✓			
Insulator	7293				
Lather/Interior Systems Mechanics	7284		✓		
Machinist/Machining Tool Operators	9511		✓		
Nondestructive Testers and Inspectors	2261			✓	
Other Trades and Related Occupations	7383	✓		✓	
Other Wood Products Assemblers and Inspectors	9493	✓			
Painters and Decorators	7294		✓		
Plasterers, Drywall Installers and Finishers and Lathers	7284		✓		
Plating, Metal Spraying and Related Operators	9497	✓			
Plumber	7251		✓		
Residential Home Builders and Renovators	0712				
Roofer	7291		✓		
Steamfitters, Pipefitters and Sprinkler System Installers	7252		✓		
Tilesetter	7283		✓		
Woodworking Machine Operator	9224		✓		

TRANSITIONS - *Construction Technologies: Summary of Related Post-secondary Programs*

	PUBLIC COLLEGES												PRIVATE COLLEGES					TECH INST.		Banff	UNIVERSITIES			VOCATIONAL COLLEGES			
	Alberta College of Art & Design	Fairview College	Grande Prairie Regional College	Grant MacEwan Community College	Keyano College	Lakeland College	Lethbridge Community College	Medicine Hat College	Mount Royal College	Olds College	Red Deer College	**APPRENTICESHIP TRADE**	Augustana University College	Canadian Union College	Concordia College	King's University College, The	North American Baptist College	Northern Alberta Institute of Technology	Southern Alberta Institute of Technology	Banff Centre	University of Alberta	University of Calgary	University of Lethbridge	AVC - Calgary	AVC - Edmonton	AVC - Lac La Biche	AVC - Lesser Slave Lake
Civil Engineering Technologies (including Building Construction)							D											D	D					C			C
Bricklayer												3y															
Carpenter (including Cabinetmaker, Millwork & Carpentry, Pre-employment Carpentry, and Production Cabinetmaker)		V				C(12w)		8w				4y						VC	VC							C	C(14w)
Construction Management/Technology and Residential Renovation Contractor								24w										C	V		C						
Elevator Constructor												4y															
Floorcovering Installer												2y						V									
Glassworker												4y															
Heavy Equipment/Industrial Operations (including Crane & Hoisting Equipment Operator, Crawler Tractor, Front End Loader, Hydraulic Backhoe Excavating, Motor Grader/Scraper)					C(5w)							1y2y 3y															
Insulator												4y															
Other Contruction related Apprenticeship Trades (including Cement Finisher, Lather Interior Systems Mechanic, Painter & Decorator, Roofer and Tilesetter)												3y															
Sheet Metal Worker												4y															
Wood Processing Technololgy																		2yr									

CODES:

B	Bachelor's Degree	D	Diploma (2 years)	w	weeks
M	Master's Degree	V	Varies	m	months
Ph.D	Doctoral Degree	1t	One-year transfer	y	years
C	Certificate (1 year or less)	2t	Two-year transfer		

*Information adapted from "It's About Time" To Start Thinking About Your Future," Advanced Education and Career Development, 1995.

CREDENTIALLING – *Construction Technologies: Credentialling Opportunities*★ *(March 1997)*

The following credentialling opportunities link with modules in the Construction Technologies and other strands.

Certificate	Agency	Modules	Instructor Qualifications	Comments
Explosive Actuated Tools	Technical Institute or College (post-secondary)	Concrete Work (CON3010)	EAT certificate	Required by OH&S for all operators to be certified. Formal credentialling to be arranged through local college or technical institute.
Construction Safety Training System	Alberta Construction Safety Association	Site Management (CON3110)	Alberta Construction Safety Association Trainer	Can be offered through a CD-ROM interactive video computer system.
Emergency First Aid	St. John Ambulance Canadian Red Cross	Personal Safety (Management) (CTR1210)	Certified First Aid/CPR Instructor	Three-year nationally recognized certificate.
Workplace Hazardous Materials Information Systems (WHMIS)	Occupational Health and Safety	Personal Safety (Management) (CTR1210)	WHMIS Instructor	Addresses skills required to work safely with hazardous materials.
Transportation of Dangerous Goods (TDG)	Transportation and Utilities	Workplace Safety (Practices) (CTR2210)	TDG Instructor	Addresses skills required by individuals involved with the transportation and handling of dangerous goods.

★ Further information regarding these and other credentialling opportunities available to CTS students is available through Alberta Education's web site at <http://ednet.edc.gov.ab.ca>.

CONSTRUCTION TECHNOLOGIES

SECTION I: LEARNING RESOURCE GUIDE

This section of the GSI has been designed to provide a list of resources that support student learning.

Three types of resources are identified:

- Authorized: Resources authorized by Alberta Education for CTS curriculum; these resources are categorized as basic, support, or teaching
- Other: Titles provided as a service to assist local jurisdictions to identify resources that contain potentially useful ideas for teachers. Alberta Education has done a preliminary review of these resources, but further review will be necessary prior to use in school jurisdictions
- Additional: A list of local, provincial and national sources of information available to teachers, including the community, government, industry, and professional agencies and organizations.

The information contained in this Guide, although as complete and accurate as possible as of June 1997, is time-sensitive.

For the most up-to-date information on learning resources and newer editions/versions, consult the LRDC *Buyers Guide* and/or the agencies listed in the Distributor Directory at the end of this section.

CTS is on the Internet
Internet Address:
http://ednet.edc.gov.ab.ca

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INTRODUCTION

CTS AND THE RESOURCE-BASED CLASSROOM

Career and Technology Studies (CTS) encourages teachers to establish a resource-based classroom, where a variety of appropriate, up-to-date print and nonprint resources are available. Learning resources identified for CTS strands include print, software, video and CD-ROM formats. Also of significance and identified as appropriate throughout each strand are sources of information available through the Internet.

The resource-based classroom approach accommodates a variety of instructional strategies and teaching styles, and supports individual or small group planning. It provides students with opportunities to interact with a wide range of information sources in a variety of learning situations. Students in CTS are encouraged to take an active role in managing their own learning. Ready access to a strong resource base enables students to learn to screen and use information appropriately, to solve problems, to meet specific classroom and learning needs, and to develop competency in reading, writing, speaking, listening and viewing.

PURPOSE AND ORGANIZATION OF THIS DOCUMENT

The purpose of this document is to help teachers identify a variety of resources to meet their needs and those of the students taking the new CTS curriculum. It is hoped that this practical guide to resources will help teachers develop a useful, accessible resource centre that will encourage students to become independent, creative thinkers.

This document is organized as follows:

- Authorized Resources:
    - – basic learning resources
    - – support learning resources
    - – teaching resources
- Other Resources
- Additional Sources
- Distributor Directory.

Some resources in the guide have been authorized for use in some or all of the CTS strands, e.g., the Career and Technology Studies video series produced by ACCESS: The Education Station. Further information is provided in relevant sections of this resource guide.

Each resource in the guide provides bibliographic information, an annotation where appropriate, and a module correlation to the CTS modules. The distributor code for each entry will facilitate ordering resources. It is recommended that teachers preview all resources before purchasing, or purchase one copy for their reference and additional copies as required.

Distributor Code	Resources		Levels/Mod. No.		
			1	2	3
ACC	Title	Author	1010	2010	3010
	Bibliographic Information				
	Annotation				

Distributor Code - see Distributor Directory

1 = Introductory
2 = Intermediate
3 = Advanced

Indicates module number

HOW TO ORDER

Most authorized resources are available from the Learning Resources Distributing Centre (LRDC) at:

12360 – 142 Street
Edmonton, AB T5L 4X9
Telephone: 403–427–5775 (outside of Edmonton dial 310–0000 to be connected toll free)
Fax: 403–422–9750
Internet: http://ednet.edc.gov.ab.ca/lrdc

Please check LRDC for availability of videos.

RESOURCE POLICY

Alberta Education withdraws learning and teaching resources from the provincial list of approved materials for a variety of reasons; e.g., the resource is out of print; a new edition has been published; the program has been revised. Under section 44 (2) of the *School Act*, school boards may approve materials for their schools, including resources that are withdrawn from the provincial list. **Many school boards have delegated this power to approve resources to school staff or other board employees under section 45 (1) of the *School Act*.**

For further information on resource policy and definitions, refer to the *Student Learning Resources Policy* and *Teaching Resources Policy* or contact:

Learning Resources Unit, Curriculum Standards Branch
Alberta Education
5th Floor, Devonian Building, East Tower
11160 Jasper Avenue
Edmonton, AB T5K 0L2
Telephone: 403–422–4872 (outside of Edmonton dial 310–0000 to be connected toll free)
Fax: 403–422–0576
Internet: http://ednet.edc.gov.ab.ca

Note: Owing to the frequent revisions of computer software and their specificity to particular computer systems, newer versions may not be included in this guide. However, schools may contact the LRDC directly at 403–427–5775 for assistance in purchasing computer software.

Trademark Notices: Microsoft, Access, Excel, FoxPro, Mail, MS-DOS, Office, PowerPoint, Project, Publisher, Visual Basic, Visual C++, Windows, Windows NT, Word, and Works are either registered trademarks or trademarks of Microsoft Corporation. Apple, Mac, Macintosh, and Power Macintosh are either registered trademarks or trademarks of Apple Computer, Inc. Other brand and product names are registered trademarks or trademarks of their respective holders.

AUTHORIZED RESOURCES

BASIC LEARNING RESOURCES

The following basic learning resources have been authorized by Alberta Education for use in the Construction Technologies curriculum. These resources address the majority of the learner expectations in one or more modules and/or levels. A curriculum correlation appears in the right-hand column.

Distributor Code	Resources	Levels/Module No.		
		1	2	3
LRDC	*Carpentry and Building Construction.* (5th edition.) J. Feirer et al. Glencoe/McGraw-Hill, 1997. A comprehensive building construction resource for the advanced level student. Newly revised with up-to-date information on engineered work products, energy efficiency, remodelling and renovating. Includes cross-curricular activities to build skills in language arts, math, science and social studies. An instructor's resource guide provides lesson plans, career profiles, masters and transparencies. A student workbook is also available.	1070	2010 to 2090	3010 to 3070 3090 3110 3120 3160 3170 3210
LRDC	*Cabinetmaking and Millwork.* John L. Feirer. Mission Hills, CA: Glencoe Publishing Company, 1988. Provides step-by-step instruction on how to build furniture, cabinets, built-ins and interior wall finishing as well as wood finishing techniques. Also includes a section on tool maintenance and industrial production.	1120 1130 1140 1160	2130 to 2180	3120 to 3190
LRDC	*Design and Technology.* Colin Caborn, Ian Mould and John Cave. Scarborough, ON: Nelson Canada, 1989. Adopts an integrated approach that links design with technology. Content includes information and activities related to materials, tools, structures, mechanism and micro electronics.	1010 1070 1120 1130 1160 1180	2120 to 2170 2200	
LRDC	*Exploring Woodworking: Fundamentals of Technology.* Fred W. Zimmerman and Larry J. McWard. South Holland, IL: Goodheart-Willcox Co. Inc., 1993. Deals with the fundamentals of working safely with hand and power tools. Emphasizes the important role that wood and wood by-products play in our everyday lives. Project ideas are included. Student workbook contains questions on each chapter. Uses Imperial measurement only. Instructor's guide and answer key are available.	1010 1120 1130 1140	2140 to 2180 2200	3130 3140 3150
LRDC	*Living With Technology.* (2nd edition.) Michael Hacker and Robert Barden. Albany, NY: Delmar Publishers Inc., 1993. Uses a "cluster" framework to analyze the major areas of technology—manufacturing, construction, communications, energy, power and transportation. The teacher's resource guide includes lesson plans, teaching strategies, quizzes and instructional aides for each chapter. Uses Imperial measurements only.	1010 1070 1120 1130 1140 1160 1180	2010 2020 2040 2050 2070 2080 2190 2200	3010 3090 3100 3190 3200

Basic Learning Resources (continued)

Distributor Code	Resources	Levels/Module No.		
		1	2	3
LRDC	*Modern Carpentry: Building Construction Details in Easy-to-Understand Form.* Willis H. Wagner and H. Smith. Goodheart-Willcox Co., Inc., Irwin Publishing, 1996. Provides current information about equipment methods and materials employed in light and residential construction. Other topics include post and beam construction, fireplaces, prefabricated structures and solar heating. The text contains 1600 photos and drawings with a colour section dedicated to wood samples and their various colour samples and their various colour and grain characteristics. Instructor's manual includes lesson plans, teaching strategies, and answers to student workbook. Teacher's resource binder and transparencies are useful tools for teaching carpentry accompanied with the textbook. The resource binder facilitates the development of a carpentry curriculum by offering suggestions on course content and providing course material for the novice as well as the experienced instructor. Uses Imperial measurement only.	1070	2010 to 2060	3010 to 3080 3100 3160 3170
LRDC	*Modern Woodworking.* W. Wagner and C. Kicklighter. Goodheart-Willcox Co., Inc., Irwin Publishing, 1996. This set of resources is intended for a wide audience ranging from high school student to apprentice cabinetmaker and carpenter. Topics include: wood and wood products, furniture, cabinet and pattern making, residential construction, tool safety and career information. The instructor's manual and student workbook include teaching strategies, questions and problems that reinforce and enrich materials in the text.	1070 1120 1130 1140 1180	2010 2020 2040 2060 2130 2140 2160 to 2190	3010 3050 3060 3120 3130 3140 3160 3210
LRDC	*Technology Shaping Our World.* John Gradwell, Malcolm Welch and Eugene Martin. Goodheart-Willcox Co., Inc., Copp Clark Longman, 1996. Introduces students to modern technology. Organizes learning so that students progress from planning to designing and communicating to applied activities within a technological system. Teachers should be aware that in the 1996 edition the student pictured on page 70 is not wearing the appropriate clothing and personal protective equipment. An instructor's guide is available.	1010 1070 1120 1130 1160 1180	2010 2040 2050 2070 2080 2090 2190 2200	3190
LRDC	*Thompson's™ Woodworking Safety Handbook.* (2nd edition.) R. Thompson. Thompson Safety Handbooks Inc., 1996. This book is a comprehensive one-stop resource for information essential to workshop safety. Topics include: general safety issues; workshop design; personal protective equipment; safe use of hand and powered hand tools as well as stationary machine tools.	1010 1070 1120 1130 1140 1160 1180	2040 2050 2120 to 2180	3040 3050 3060 3120 3130 3150 3160 3190

SUPPORT LEARNING RESOURCES

Support learning resources are authorized by Alberta Education to assist in addressing some of the learner expectations of a module or components of modules.

Distributor Code	Resources	Levels/Module No.		
		1	2	3
LRDC	*Air Sealing Your House – From House to Home.* Outremont, PQ: Video Club of America. Video. Presents basic principles and methods of air sealing a home.		2090	3030 3080
LRDC	*Art of Construction, The: Projects and Principles for Beginning Engineers and Architects.* Mario Salvadori. Chicago, IL: Chicago Review Press, 1990. Draws on examples from the past and present to explain the principles of construction. Student activities have been identified to create durable and engaging projects.	1010 1070 1160	2040 2050 2100	
LRDC	*Avoiding Concrete Problems.* (Builders Series.) Canada Mortgage and Housing Corporation, 1987. Video. Repairs to concrete foundation walls and floors can be costly to repair. This objective video clearly demonstrates techniques that help builders avoid or reduce their problems.	1070	2010 2020	3010 3020
LRDC	*Avoiding Drywall Problems.* (Builders Series.) Canada Mortgage and Housing Corporation. Video. Cracks and nail are common problems related to drywalling. This video identifies some of the most common things that go wrong, examines the causes and suggests how to solve them.		2040 2050	3050
LRDC	*Avoiding Wood Frame Construction Problems.* (Builders Series.) Canada Mortgage and Housing Corporation, 1994. Video. There is often a simple reason why floors squeak, roofs sag and doors stick. This video demonstrates ways to avoid floor, wall and roof framing problems.		2040	3030
LRDC	*Basic Carpentry – Hands-on Series: Home Improvement Video.* Windmill Point Oriental, NC: D.I.Y. Video Corp. Do It Yourself, Inc. Video. Presents basic tools and techniques used on typical carpentry projects.	1010 1120 1130 1140 1160		
LRDC	*Basic Insulation Projects – From House to Home.* Outremont, PQ: Video Club of America. Video. Describes basic insulating techniques used in the home.		2060 2080	

Support Learning Resources (continued)

Distributor Code	Resources	Levels/Module No.		
		1	2	3
LRDC	*Building Bookcases – Hands-on Series: Woodworking*. Windmill Point Oriental, NC: D.I.Y. Video Corp. Do It Yourself, Inc. Video. Provides time-saving techniques related to bookcase construction.	1160	2160 2170	
LRDC	*Building Cabinets – Hands-on Series: Woodworking*. Windmill Point Oriental, NC: D.I.Y. Video Corp. Do It Yourself, Inc. Video. A step-by-step video that covers basic box-type construction techniques.	1160	2130 2160 2170	3160
LRDC	*Building Tables – Hands-on Series: Woodworking*. Windmill Point Oriental, NC: D.I.Y. Video Corp. Do It Yourself, Inc. Video. Provides suggestions to overcome common mistakes and problems associated with table construction.	1130 1160		3130
LRDC	*Canadian Wood-Frame House Construction: Second Metric Edition*. Ottawa, ON: CMHC Publication, 1988. Describes how wood-frame houses are put together in Canada. Presents the most commonly employed construction methods and provides suggestions for the selection of suitable materials for house construction. Please note this text has been reprinted in 1989, 1991 and 1992.	1070	2010 to 2090	3010 to 3080 3110
ACC	*Career and Technology Studies: Key Concepts*. Edmonton, AB: ACCESS: The Education Station. A series of videos and utilization guides relevant to all CTS strands. The series consists of: *Anatomy of a Plan; Creativity; Electronic Communication; The Ethics Jungle; Go Figure; Innovation; Making Ethical Decisions; Portfolios; Project Planning; Responsibility* and *Technical Writing*.	all	all	all
LRDC	*Carpenter's Manifesto, The*. (Revised and updated.) Jeffrey Ehrlich and Marc Mannheimer. New York, NY: Henry Holt and Company, 1990. Presents an analyses of structural principles. Shows how wood and other building materials can be made into useful products.	1010 1120 1130 1160	2130 2140 2160 2170	3120 3170
LRDC	*Carpentry and Building Construction*. (5th edition.) J. Feirer et al. Glencoe/McGraw-Hill, 1997. Workbook. See Basic Learning Resources for module correlation and annotation.			

Support Learning Resources (continued)

Distributor Code	Resources	Levels/Module No.		
		1	2	3
LRDC	*Concrete Formwork.* Leonard Koel. Homewood, IL: American Technical Publishers, Inc., 1988. Provides information on safe construction of concrete forms for residential and light construction application. Also covers print reading, concrete placement and finishing.		2010 2020	3010 3100
LRDC	*Concrete Technology.* (3rd edition.) George R. White. Delmar Publishers Inc., 1991. The text is based on the fundamentals of concrete work. Information is focused on an understanding of cement and concrete products as applied in construction work.	1180	2020	3010 3020
LRDC	*Construction Systems.* Robert Weisbach, et al. Goodheart-Willcox Company. Irwin Publishing, 1996. Text and Student Activity Manual. This resource introduces students to the construction industry by exploring its origin, impact on society, organization, and systems of production. Each chapter begins with a set of objectives, key terms and concludes with a set of review questions and activities. An instructor's manual is available.	1070 1120 1160	2010 to 2050 2070 2080 2090 2120 2170 2190	3010 3030 3050 3080 3160
LRDC	*Construction Technology.* (3rd edition.) Mark W. Huth. Thompson Learning Tools. ITP Nelson Canada, 1996. Introduces students to the construction industry – how it is organized and controlled, its impact on society and opportunities for employment.	1010 1070	2010 to 2090	3010 3020 3050 3070 3110 3120 3170
LRDC	*Construction Technology: Today and Tomorrow.* James F. Fales. Mission Hills, CA: Glencoe/McGraw-Hill, 1991. Student Text and Workbook. A comprehensive text that builds the student's understanding of the construction industry. Features health and safety issues and integrates basic academic skills.	1010 1070	2010 to 2090	3010 3020 3050 3070 3110 3120 3170
LRDC	*Design and Technology.* Kathy Browning, et al. Toronto, ON: McGraw-Hill Ryerson Limited, 1993. Explores structures, energy, machines, materials and fabrication processes with an emphasis on designing, decision making and problem solving.	1010 1070 1120 1130 1140 1200	2120 2200	

Support Learning Resources (continued)

Distributor Code	Resources	Levels/Module No.		
		1	2	3
LRDC	*Exploring Woodworking: Fundamentals of Technology*. Fred W. Zimmerman and Larry J. McWard. South Holland, IL: Goodheart-Willcox Co. Inc., 1993. Workbook. See Basic Learning Resources for module correlation and annotation.			
LRDC	*Furniture Refinishing Made Easy*. D. Sands. Lone Pine Publishing, 1992. This resource deals with a variety of finishing/refinishing topics including work environment safety, furniture and casework cleaning, stripping, sanding, painting, staining and waxing. The book uses black and white illustrations throughout and contains a useful glossary of terms.		2150	3150
LRDC	*Homes Today and Tomorrow*. (5th edition.) R.F. Sherwood. Glencoe/McGraw-Hill, 1997. Text and Student Workbook. A colorful well illustrated text on housing and interior design. Topics include housing needs, housing styles, consumer concerns, construction methods, elements and principles of design, planning interiors and applying design and construction principles. The resource has a strong career focus with interviews with practising designers, links from the classroom to the workplace and "Design Challenge" activities to help students build portfolios. A teacher's annotated edition is available.	1070	2070 2080 2090	3090 3150 3170
LRDC	*Installing Ventilation Properly – From House to Home*. Outremont, PQ: Video Club of America. Video. Show how air quality affects comfort and cost of heating/cooling a home.		2100	3100
LRDC	*Layman's Guide to Contracting Your Own Home, The. A Step-By-Step Guide*. D. Caldwell. Designs by Caldwell, 1994. This is a step-by-step guide on being your own contractor. It includes design, approvals for estimates and project management.	1070	2010 2020 2030 2060	
LRDC	*Manufacturing Technology*. Stanley A. Komacek. Albany, NY: Delmar Publishers Inc., 1990. Introduces student to manufacturing; identifies how natural resources are processed and made into finished products. Also describes how industry is organized and the roles people play within it.	1010 1120 1130 1160 1180 1200	2190 2200	3190 3200

Support Learning Resources (continued)

Distributor Code	Resources	Levels/Module No.		
		1	2	3
LRDC	*Manufacturing Technology: Today and Tomorrow.* Robert A. Daiber and Thomas L. Erekson. Mission Hills, CA: Glencoe McGraw Hill, 1991. Features a hands-on approach that introduces student to the manufacturing industry. This resource helps students discover how materials, tools and processes are used in manufacturing. It also correlates math, language arts, science and social studies skills through review activities.	1010 1120 1130 1160 1180	2190 2200	3120 3190 3200
LRDC	*Modern Carpentry: Building Construction Details in Easy-to-Understand Form.* Willis H. Wagner and H. Smith. Goodheart-Willcox Co., Inc., Irwin Publishing, 1996. Workbook. See Basic Learning Resources for module correlation and annotation.			
LRDC	*Modern Plumbing.* Keith E. Blankenbaker. South Holland, IL: Goodheart-Willcox Co. Inc., 1992. Provides basic information on materials, tools and processes related to residential plumbing and heating systems.		2080 2090	3080 3110
LRDC	*Modern Woodworking.* W. Wagner and H. Smith. Goodheart-Willcox Co., Inc., Irwin Publishing, 1996. Workbook. See Basic Learning Resources for module correlation and annotation.			
LRDC	*Ortho's Basic Home Building: An Illustrated Guide.* San Ramon, CA: Chevron Chemical Company, 1991. Presents all the steps of building a new house – from obtaining permits to construction as well as preparing the house for final painting, flooring and decorating.	1070	2010 2020 2040 to 2090	3010 to 3060 3110 3170
LRDC	*Ortho's Home Improvement Encyclopedia: Problem Solving From A to Z* (Revised Edition). A. Ahlstrand. San Ramon, CA: Fitzhenry & Whiteside, Monsanto Co., 1994. Covers basic aspects of planning, designing, building, remodeling, repairing and home improvement projects.	1070 1130	2010 2020 2040 to 2090 2150 2160 2170	3010 to 3070 3090

Support Learning Resources (continued)

Distributor Code	Resources	Levels/Module No.		
		1	2	3
LRDC	*Plastic Piping Systems*. (2^{nd} edition.) David A. Chasis. New York, NY: Industrial Press. Inc., 1988. Technical Reference Book. Provides a comprehensive look at plastic materials and piping applications.		2080	3100
LRDC	*Principles and Practices of Heavy Construction*. (4^{th} edition.) Ronald C. Smith and Cameron K. Andres. Englewood Cliffs, NJ: Regents/Prentice Hall, 1993. An advanced level text that focuses on the materials and processes used in heavy construction. Uses Canadian standards.		2010 2020	3010 3020 3050 3100 3110
LRDC	*Production Technology*. Stanley A. Komacek. Albany, NY: Delmar Publishers Inc., 1993. Student Text. Offers a broad exploration of the tools, materials and processes of production. Demonstrates how production technology affects and is affected by science and math.	1010 1070 1120 1130 1140 1160 1180 1200	2010 to 2060 2120 2190 2200	3010 3020 3030 3060 3070 3200
LRDC	*Structures With Materials* (GCSE Technology.) S. Rich. Stanley Thornes (Publishers) Ltd., 1991. Applies a problem-solving approach to the "harder" end of technology. Activities are designed for both individual and group settings. Teachers should be aware that a potential community concern may exist regarding the topic of evolution (page 32).	1010 1070 1120	2020 2030 2040 2050	3020 3090
LRDC	*Technology: Today & Tomorrow*. (3^{rd} edition.) J. Fales and V. Kuetemeyer, et al. Glencoe/McGraw-Hill, 1997. Text and Student Workbook. This resource deals with five important areas of technology – communication, manufacturing, transportation, construction and biotechnology. In addition, the problem solving process is defined, parts of a technological system are explained and curricular and cross-curricular activities are provided. Imperial measurements are used throughout this resource. Teacher's annotated edition, teacher's resource binder, making connections and media correlations are available.	1010 1070 1120	2190 2200	
LRDC	*Ventilation and Heating Projects – From House to Home*. Outremont, PQ. Video Club of America. Video. Explain how to balance a central forced air furnace so that even temperatures are achieved throughout a house.		2090	3030 3080

TEACHING RESOURCES

The following teaching resources are authorized by Alberta Education to assist teachers in the instructional process.

Distributor Code	Resources	Levels/Module No.		
		1	2	3
LRDC	*Carpentry and Building Construction.* (5th edition.) J. Feirer, et al. Glencoe/McGraw-Hill, 1997. Instructor's Resource Guide. See Basic Learning Resources for module correlation and annotation.			
LRDC	*Chisels on a Wheel: A Comprehensive Reference to Modern Woodworking Tools and Materials.* Jim Effner. Prakken Publications, Inc., 1992. Teacher's Resource. A comprehensive reference to modern woodworking tools and materials.	1130 1160	2130 2140 2160 2170	3130 to 3190
LRDC	*Construction Systems.* Robert Weisbach, et al. Goodheart-Willcox Company. Irwin Publishing, 1996. Instructor's Manual. See Support Learning Resources for module correlation and annotation.			
LRDC	*Construction Technology.* (3rd edition.) Mark W. Huth. Thomson Learning Tools. ITP Nelson Canada, 1996. Instructor's Guide. See Support Learning Resources for module correlation and annotation.			
LRDC	*Construction Technology: Today and Tomorrow.* James F. Fales. Mission Hills, CA: Glencoe/McGraw-Hill, 1991. Teacher's Annotated Edition and Teacher's Resource Binder. See Support Learning Resources for module correlation and annotation.			
LRDC	*Design and Technology.* Kathy Browning, et al. Toronto, ON: McGraw-Hill Ryerson Limited, 1994. Teacher's Resource. See Support Learning Resources for module correlation and annotation.			
PSK	*Electric Code Simplified.* (4th edition.) P.S. Knight. Richmond, BC: P.S. Knight Co. Ltd., 1988. A simplified version of the Canadian Electrical Code associated with residential construction.		2010 2040 2050 2070	3110

Teaching Resources (continued)

Distributor Code	Resources	Levels/Module No.		
		1	2	3
LRDC	*Exploring Woodworking: Fundamentals of Technology*. Fred W. Zimmerman and Larry J. McWard. South Holland, IL: Goodheart-Willcox Co. Inc., 1993. Instructor's Guide and Answer Key. See Basic Learning Resources for module correlation and annotation.			
LRDC	*Heat Kit, The – Home Energy Analysis and Tutorial*. Edmonton, AB. Alberta Energy - Energy Efficiency Board. Information and skill building tutorial on energy efficient house.		2040	3030 3080
LRDC	*Homes Today and Tomorrow*. (5th edition.) R.F. Sherwood. Glencoe/McGraw-Hill, 1997. Teacher's Annotated Edition. See Support Learning Resources for module correlation and annotation.			
LRDC	*Living With Technology*. (2nd edition.) Michael Hacker, and Robert Barden. Albany, NY: Delmar Publishers Inc., 1993. Teacher's Resource Guide. See Basic Learning Resources for module correlation and annotation.			
SAIT	*Manual Hand Tools: A Visual Data Base*. Calgary, AB: Educational Resource Department, Southern Alberta Institute of Technology. Videodisk and index. Contains photos of over 700 manual hand tools in 50 different classifications, plus motion sequences focusing on 38 tools. Also contains an alphabetical index of tool names, frame numbers and short description of each frame. Can be used with Hypercard.	all	all	all
LRDC	*Modern Carpentry: Building Construction Details in Easy-to-Understand Form*. Willis H. Wagner. Goodheart-Willcox Co., Inc., Irwin Publishing, 1996. Instructor's Manual and Answer Key; Teacher's Resource Manual and Transparencies. See Basic Learning Resources for module correlation and annotation.			
LRDC	*Modern Woodworking*. W. Wagner and H. Smith. Goodheart-Willcox Co., Inc., Irwin Publishing, 1996. Instructor's Guide. See Basic Learning Resources for module correlation and annotation.			

Teaching Resources (continued)

Distributor Code	Resources	Levels/Module No.		
		1	2	3
LRDC	*Technology Shaping Our World.* John Gradwell, Malcolm Welch and Eugene Martin. South Holland, IL: Goodheart-Willcox Co., Inc., 1996. Instructor's Manual. See Basic Learning Resources for module correlation and annotation.			
LRDC	*Technology: Today & Tomorrow.* (3rd edition.) J. Fales and V. Kuetemeyer, et al. Glencoe/McGraw-Hill, 1997. Teacher's Annotated Edition; Teacher's Resource Binder (NOTE: Authors are C. Haller & E. Thompson); Making Connections; Media Correlations. See Support Learning Resources for annotation and module correlation.			

CONSTRUCTION TECHNOLOGIES RESOURCES

THEME CODE:
A. Building Systems:
(Processes and Applications)
B. Manufacturing Systems
(Processes and Applications)

FORMAT CODE:
p - Print
v - Video
s - Software
vd - videodisk

STATUS CODE:
B - Basic
S - Support
T - Teaching

LEVEL CODE:
1 - Introductory
2 - Intermediate
3 - Advanced

JR/SR HIGH CODE:
J - Junior High
S - Senior High

Module Number	Format	Status	Junior/Senior High	1010 Basic Tools & Materials	1070 Building Construction	1120 Project Management	1130 Solid Stock Construction	1140 Turning Operations	1160 Manufactured Materials	1180 Mold Making & Casting	2010 Site Preparation	2020 Concrete Forming	2030 Alternate Foundations	2040 Framing Systems 1	2050 Roof Structures 1	2060 Exterior Finishing	2070 Electrical Systems	2080 Plumbing Systems	2090 Climate Control Systems	2100 Agri-structures	2120 Multiple Materials	2130 Furniture Making 1	2140 Furniture Making 2	2150 Finishing & Refinishing	2160 Cabinetmaking 1	2170 Cabinetmaking 2	2180 Wood Forming	2190 Manufacturing Systems	2200 Product Development	3010 Concrete Work	3020 Masonry Work	3030 Wall & Ceiling Finishing	3040 Stair Construction	3050 Roof Structures 2	3060 Doors & Trim	3070 Floorcovering	3080 Energy-efficient Housing	3090 Renovations/Restorations	3100 Commercial Structures	3110 Site Management	3120 Tool Maintenance	3130 Furniture Making 3	3140 Furniture Making 4	3150 Furniture Repair	3160 Cabinetmaking 3	3170 Cabinetmaking 4	3190 Production Planning	3200 Production Management	3210 Framing Systems 2
LEVEL				1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
THEME				A	A	B	B	B	B	B	A	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	A	A	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	A
Air Sealing Your House - From House to Home	v	S	S																X													X					X												
Art of Construction, Projects & Principles for Beginning Engineers & Architects, The	p	S	J/S	X	X				X					X	X					X																													
Avoiding Concrete Problems	v	S	J/S		X						X	X																		X	X																		
Avoiding Drywall Problems	v	S	S											X	X																			X															
Avoiding Wood Frame Construction Problems	v	S	S											X																		X																	
Basic Carpentry - Hands On Series: Home Improvement Video	v	S	J	X		X	X	X	X																																								
Basic Insulation Projects - From House to Home	v	S	S													X		X																															
Building Bookcases - Hands-On Series: Woodworking	v	S	J/S						X																X	X																			X				
Building Cabinets - Hands On Series: Woodworking	v	S	J/S						X													X			X	X																			X				
Building Tables - Hands on Series: Woodworking	v	S	J/S				X		X																																	X							
Cabinetmaking and Millwork	p	B	J/S			X	X	X	X													X	X	X	X	X	X														X	X	X	X	X	X	X		
Canadian Wood-Frame House Construction: Second Metric Edition	p	S	J/S		X						X	X	X	X	X	X	X	X	X											X	X	X	X	X	X	X	X			X									

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CONSTRUCTION TECHNOLOGIES RESOURCES

THEME CODE:
A. Building Systems
(Processes and Applications)
B. Manufacturing Systems
(Processes and Applications)

FORMAT CODE:
p - *Print*
v - *Video*
s - *Software*
vd - *videodisk*

STATUS CODE:
B - Basic
S - Support
T - Teaching

LEVEL CODE:
1 - Introductory
2 - Intermediate
3 - Advanced

JR/SR HIGH CODE:
J - Junior High
S - Senior High

Module Number	*Format*	*Status*	*Junior/Senior High*	1010 Basic Tools & Materials	1070 Building Construction	1120 Project Management	1130 Solid Stock Construction	1140 Turning Operations	1160 Manufactured Materials	1180 Mold Making & Casting	2010 Site Preparation	2020 Concrete Forming	2030 Alternate Foundations	2040 Framing Systems 1	2050 Roof Structures 1	2060 Exterior Finishing	2070 Electrical Systems	2080 Plumbing Systems	2090 Climate Control Systems	2100 Agri-structures	2120 Multiple Materials	2130 Furniture Making 1	2140 Furniture Making 2	2150 Finishing & Refinishing	2160 Cabinetmaking 1	2170 Cabinetmaking 2	2180 Wood Forming	2190 Manufacuring Systems	2200 Product Development	3010 Concrete Work	3020 Masonry Work	3030 Wall & Ceiling Finishing	3040 Stair Construction	3050 Roof Structures 2	3060 Doors & Trim	3070 Floorcovering	3080 Energy-efficient Housing	3090 Renovations/Restorations	3100 Commercial Structures	3110 Site Management	3120 Tool Maintenance	3130 Furniture Making 3	3140 Furniture Making 4	3150 Furniture Repair	3160 Cabinetmaking 3	3170 Cabinetmaking 4	3190 Production Planning	3200 Production Management	3210 Framing Systems 2
LEVEL				1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
THEME				A	A	B	B	B	B	B	A	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	A	A	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	A
Carpenter's Manifesto, The	*p*	S	J/S	X		X	X		X													X	X		X	X															X					X			
Carpentry and Building Construction (5th Ed.)					X						X	X	X	X	X	X	X	X	X											X	X	X	X	X	X	X		X		X	X				X	X			X
Text	*p*	B	J/S																																														
Workbook	*p*	S	J/S																																														
Instructor's Resource Guide	*p*	T	J/S																																														
Chisels On A Wheel: A Comprehensive Reference to Modern Woodworking Tools and Materials	*p*	T	J/S				X		X													X	X		X	X																X	X	X	X	X	X		
Concrete Formwork	*p*	S	S								X	X																		X									X										
Concrete Technology (3rd Ed.)	*p*	S	J/S							X		X																		X	X																		
Construction Systems					X	X			X		X	X	X	X	X		X	X	X		X					X		X		X		X		X			X								X				
Text & Student Activity Manual	*p*	S	J/S																																														
Instructor's Manual	*p*	T	J/S																																														
Construction Technology (3rd Ed.)				X	X						X	X	X	X	X	X	X	X	X											X	X			X		X				X	X					X			
Text	*p*	S	J/S																																														
Instructor's Guide	*p*	T	J/S																																														
Construction Technology: Today and Tomorrow				X	X						X	X	X	X	X	X	X	X	X											X	X			X		X				X	X					X			
Student Text & Workbook	*p*	S	J/S																																														
Teacher's Annotated Edition	*p*	T	J/S																																														
Teacher's Resource Binder	*p*	T	J/S																																														

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Module Number	*Format*	*Status*	*Junior/Senior High*	1010 Basic Tools & Materials	1070 Building Construction	1120 Project Management	1130 Solid Stock Construction	1140 Turning Operations	1160 Manufactured Materials	1180 Mold Making & Casting
LEVEL				1	1	1	1	1	1	1
THEME				A	A	B	B	B	B	B
Design and Technology (Nelson)	*p*	B	J/S	X	X	X	X		X	X
Design and Technology (McGraw-Hill)				X	X	X	X	X		
Text & Student Workbook	*p*	S	J/S							
Teacher's Resource	*p*	T	J/S							
Electric Code Simplified (4th Ed.)	*p*	T	S							
Exploring Woodworking: Fundamentals of Technology				X		X	X	X		
Text	*p*	B	J/S							
Workbook	*p*	S	J/S							
Instructor's Guide and Answer Key	*p*	T	J/S							
Furniture Refinishing Made Easy	*p*	S	S							
Heat Kit, The - Home Energy Analysis and Tutorial	*p*	T	S							
Homes Today and Tomorrow (5th Ed.)					X					
Text	*p*	S	J/S							
Student Workbook	*p*	S	J/S							
Teacher's Annotated Edition	*p*	T	J/S							
Installing Ventilation Properly - From House to Home	*v*	S	S							
Layman's Guide to Contracting Your Own Home, The; A Step-by-Step Guide	*p*	S	J/S		X					

Module Number	2010 Site Preparation	2020 Concrete Forming	2030 Alternate Foundations	2040 Framing Systems 1	2050 Roof Structures 1	2060 Exterior Finishing	2070 Electrical Systems	2080 Plumbing Systems	2090 Climate Control Systems	2100 Agri-structures	2120 Multiple Materials	2130 Furniture Making 1	2140 Furniture Making 2	2150 Finishing & Refinishing	2160 Cabinetmaking 1	2170 Cabinetmaking 2	2180 Wood Forming	2190 Manufacturing Systems	2200 Product Development
LEVEL	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
THEME	A	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B
Design and Technology (Nelson)											X	X	X	X	X	X			X
Design and Technology (McGraw-Hill)											X								X
Text & Student Workbook																			
Teacher's Resource																			
Electric Code Simplified (4th Ed.)	X			X	X		X												
Exploring Woodworking: Fundamentals of Technology													X	X	X	X	X		X
Text																			
Workbook																			
Instructor's Guide and Answer Key																			
Furniture Refinishing Made Easy														X					
Heat Kit, The - Home Energy Analysis and Tutorial				X															
Homes Today and Tomorrow (5th Ed.)							X	X	X										
Text																			
Student Workbook																			
Teacher's Annotated Edition																			
Installing Ventilation Properly - From House to Home										X									
Layman's Guide to Contracting Your Own Home, The; A Step-by-Step Guide	X	X	X			X													

Module Number	3010 Concrete Work	3020 Masonry Work	3030 Wall & Ceiling Finishing	3040 Stair Construction	3050 Roof Structures 2	3060 Doors & Trim	3070 Floorcovering	3080 Energy-efficient Housing	3090 Renovations/Restorations	3100 Commercial Structures	3110 Site Management	3120 Tool Maintenance	3130 Furniture Making 3	3140 Furniture Making 4	3150 Furniture Repair	3160 Cabinetmaking 3	3170 Cabinetmaking 4	3190 Production Planning	3200 Production Management	3210 Framing Systems 2
LEVEL	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
THEME	A	A	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	A
Design and Technology (Nelson)																				
Design and Technology (McGraw-Hill)																				
Text & Student Workbook																				
Teacher's Resource																				
Electric Code Simplified (4th Ed.)											X									
Exploring Woodworking: Fundamentals of Technology													X	X	X					
Text																				
Workbook																				
Instructor's Guide and Answer Key																				
Furniture Refinishing Made Easy															X					
Heat Kit, The - Home Energy Analysis and Tutorial			X					X												
Homes Today and Tomorrow (5th Ed.)									X						X		X			
Text																				
Student Workbook																				
Teacher's Annotated Edition																				
Installing Ventilation Properly - From House to Home										X										
Layman's Guide to Contracting Your Own Home, The; A Step-by-Step Guide																				

CONSTRUCTION TECHNOLOGIES RESOURCES

THEME CODE:
A - Building Systems
(Processes and Applications)
B - Manufacturing Systems
(Processes and Applications)

FORMAT CODE:
p - Print
v - Video
s - Software
vd - videodisk

STATUS CODE:
B - Basic
S - Support
T - Teaching

LEVEL CODE:
1 - Introductory
2 - Intermediate
3 - Advanced

JR/SR HIGH CODE:
J - Junior High
S - Senior High

Module Number	*Format*	*Status*	*Junior/Senior High*	1010 Basic Tools & Materials	1070 Building Construction	1120 Project Management	1130 Solid Stock Construction	1140 Turning Operations	1160 Manufactured Materials	1180 Mold Making & Casting	2010 Site Preparation	2020 Concrete Forming	2030 Alternate Foundations	2040 Framing Systems 1	2050 Roof Structures 1	2060 Exterior Finishing	2070 Electrical Systems	2080 Plumbing Systems	2090 Climate Control Systems	2100 Agri-structures	2120 Multiple Materials	2130 Furniture Making 1	2140 Furniture Making 2	2150 Finishing & Refinishing	2160 Cabinetmaking 1	2170 Cabinetmaking 2	2180 Wood Forming	2190 Manufacturing Systems	2200 Product Development	3010 Concrete Work	3020 Masonry Work	3030 Wall & Ceiling Finishing	3040 Stair Construction	3050 Roof Structures 2	3060 Doors & Trim	3070 Floorcovering	3080 Energy-efficient Housing	3090 Renovations/Restorations	3100 Commercial Structures	3110 Site Management	3120 Tool Maintenance	3130 Furniture Making 3	3140 Furniture Making 4	3150 Furniture Repair	3160 Cabinetmaking 3	3170 Cabinetmaking 4	3190 Production Planning	3200 Production Management	3210 Framing Systems 2
LEVEL				1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
THEME				A	A	B	B	B	B	B	A	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	A	A	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	A
Living With Technology (2nd Ed.)				X	X	X	X	X	X	X	X	X		X	X		X	X										X	X	X								X	X								X	X	
Text	*p*	B	J/S																																														
Teacher's Resource Guide	*p*	T	J/S																																														
Manual Hand Tools: A Visual Data Base - Video Disk and Index	*vd*	T	J/S	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Manufacturing Technology	*p*	S	J/S	X		X	X		X	X																		X	X																		X	X	
Manufacturing Technology: Today and Tomorrow	*p*	S	J/S	X		X	X		X	X																		X	X												X						X	X	
Modern Carpentry: Building Construction Details in Easy-To-Understand Form					X						X	X	X	X	X	X														X	X	X	X	X	X	X	X		X						X	X			
Text	*p*	B	J/S																																														
Workbook	*p*	S	J/S																																														
Instructor's Manual and Answer Key	*p*	T	J/S																																														
Binder/Transparencies	*p*	T	J/S																																														
Modern Pumbing	*p*	S	S															X	X																		X			X									
Modern Woodworking					X	X	X	X		X	X	X		X		X						X	X		X	X	X	X		X				X	X						X	X	X		X				X
Text	*p*	B	J/S																																														
Workbook	*p*	S	J/S																																														
Instructor's Manual	*p*	T	J/S																																														
Ortho's Basic Home Building: An Illustrated Guide	*p*	S	J/S		X						X	X		X	X	X	X	X	X											X	X	X	X	X	X					X						X			

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CONSTRUCTION TECHNOLOGIES RESOURCES

THEME CODE:
A. Building Systems
(Processes and Applications)
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(Processes and Applications)

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Module Number	*Format*	*Status*	*Junior/Senior High*	1010 Basic Tools & Materials	1070 Building Construction	1120 Project Management	1130 Solid Stock Construction	1140 Turning Operations	1160 Manufactured Materials	1180 Mold Making & Casting	2010 Site Preparation	2020 Concrete Forming	2030 Alternate Foundations	2040 Framing Systems 1	2050 Roof Structures 1	2060 Exterior Finishing	2070 Electrical Systems	2080 Plumbing Systems	2090 Climate Control Systems	2100 Agri-structures	2120 Multiple Materials	2130 Furniture Making 1	2140 Furniture Making 2	2150 Finishing & Refinishing	2160 Cabinetmaking 1	2170 Cabinetmaking 2	2180 Wood Forming	2190 Manufacturing Systems	2200 Product Development	3010 Concrete Work	3020 Masonry Work	3030 Wall & Ceiling Finishing	3040 Stair Construction	3050 Roof Structures 2	3060 Doors & Trim	3070 Floorcovering	3080 Energy-efficient Housing	3090 Renovations/Restorations	3100 Commercial Structures	3110 Site Management	3120 Tool Maintenance	3130 Furniture Making 3	3140 Furniture Making 4	3150 Furniture Repair	3160 Cabinetmaking 3	3170 Cabinetmaking 4	3190 Production Planning	3200 Production Management	3210 Framing Systems 2
LEVEL				1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
THEME				A	A	B	B	B	B	B	A	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	A	A	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	A
Ortho's Home Improvement Encyclopedia: Problem Solving From A to Z (Revised Ed.)	*p*	S	J/S		X		X				X	X		X	X	X	X	X	X					X	X	X				X	X	X	X	X	X	X		X											
Plastic Piping Systems (2nd Ed.)	*p*	S	S															X																					X										
Principles and Practices of Heavy Construction (4th Ed.)	*p*	S	S								X	X																		X	X			X					X	X									
Production Technology	*p*	S	J/S	X	X	X	X	X	X	X	X	X	X	X	X	X					X							X	X	X	X	X			X	X												X	
Structures With Materials (GCSE Technology)	*p*	S	J/S	X	X	X						X	X	X	X																X							X											
Technology Shaping Our World				X	X	X	X		X	X	X			X	X		X	X	X									X	X																		X		
Text	*p*	B	J/S																																														
Instructor's Manual	*p*	T	J/S																																														
Technology: Today & Tomorrow (3rd Ed.)				X	X	X																						X	X																				
Text	*p*	S	J/S																																														
Student Workbook	*p*	S	J/S																																														
Teacher's Annotated Edition	*p*	T	J/S																																														
Teacher's Resource Binder	*p*	T	J/S																																														
Making Connections	*p*	T	J/S																																														
Media Correlations	*p*	T	J/S																																														
Thompson's Woodworking Safety Handbook (2nd Ed.)	*p*	B	J/S	X	X	X	X	X	X	X				X	X						X	X	X	X	X	X	X						X	X	X						X	X		X	X		X		
Ventilation and Heating Projects - From House to Home	*v*	S	S																X													X					X												

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OTHER RESOURCES

These titles are provided as a service only to assist local jurisdictions to identify resources that contain potentially useful ideas for teachers. Alberta Education has done a preliminary review of the resources. However, the responsibility to evaluate these resources prior to selection rests with the user, in accordance with any existing local policy.

Distributor Code	Other Resources	Levels/Module No.		
		1	2	3
LRDC	*Alberta Building Code*. Edmonton, AB: Alberta Labour.	1070	2010 to 2090	3010 to 3110 3210
AECD	*Apprenticeship Training: Carpenter and Cabinetmaker Programs.* Edmonton, AB: Alberta Advanced Education and Career Development, Apprenticeship and Trade Certification. Curriculum Outline. Describes the parameters for apprenticeship and course requirements for each period of technical training.	all	all	all
AECD	*Carpenter Apprenticeship Program*, 1st and 2nd Year. Edmonton, AB: Alberta Advanced Education and Career Development. Set of competency-based program materials covering the theory and practical components for the first period and second period of the carpentry program.	1010 1070	2010 to 2060	3010 to 3110 3210
AHBA	*Code and Construction Guide for Housing*. Edmonton, AB: Alberta Home Builders' Association, Inc. Assists in reading and interpretation of building code regulations.	1070	2010 to 2090	3010 to 3100 3210
CMH	*Concrete Foundations – Builders' Series.* Ottawa, ON: CMHC Publication, 1988. Booklet Identifies causes and provides solutions to problems in foundation walls, basement and garage slabs.		2020	3010
CMH	*Construction and the Environment – Renovators' Series.* Ottawa ON: CMHC Publication, 1993. Booklet. The purpose of this booklet is to demonstrate to builders and renovators the need for environmental pro-action.	all	all	all
AFRD	*Corrals for Handling Beef Cattle*. Edmonton, AB: Agriculture, Food and Rural Development. Provides plans for a variety of corrals and buildings used in agriculture.		2100	

Other Resources (continued)

Distributor Code	Other Resources	Levels/Module No.		
		1	2	3
CMH	*Door and Window Installation – Builders' Series.* Ottawa ON: CMHC Publication, 1988. Booklet. Covers the installation of exterior and interior doors, patio doors and fixed and operating window units.		2060	3060
CMH	*Drywall Applications – Builders' Series.* Ottawa, ON: CMHC Publication, 1990. Booklet. Identifies causes and provides solutions to problems related to drywall applications.			3030
CMH	*Glossary of House – Building and Site – Development Terms, A.* Ottawa, ON: CMHC Publication, 1982. Glossary terms used in the building construction industry.		2010	
CCA	*Guide to Site Construction Safety, A.* Calgary, AB: Calgary Construction Association. Booklet. This booklet informs workers of their personal responsibilities towards safety in construction. It covers a wide variety of issues related to worker safety in the field and in the office.			3100 3110
CMH	*Moisture Problems – Builders' Series.* Ottawa ON: CMHC Publication, 1988. Booklet. Helps builders understand what causes moisture problems in buildings, how to repair them and how to avoid them.		2020 2030	3010
CMH	*Noise Control – Builders' Series.* Ottawa ON: CMHC Publication, 1989. Booklet. Identifies some of the causes of noise transfer and methods of control.		2040	3210
PAB	*Occupational Health and Safety Act.* Edmonton, AB: Queen's Printer.	all	all	all
CMH	*Preserved Wood Foundation – Builders' Series.* Ottawa ON: CMHC Publication, 1987. Booklet. Presents some of the potential problems that may be faced by builders unfamiliar with preserved wood foundations.		2030	

Other Resources (continued)

Distributor Code	Other Resources	Levels/Module No.		
		1	2	3
CMH	*Project Manager Communication – Renovators' Series.* Ottawa ON: CMHC Publication, 1991. Booklet. Outlines a systematic approach to managing renovation projects.			3110
CMH	*Renovation: Avoiding Renovation Hazards.* Ottawa ON: CMHC Publication, 1990. Booklet. A quick reference guide for renovators. Contains more than 60 references to various hazards associated with residential renovations			3090
CMH	*Renovator's Resource Guide.* Ottawa ON: CMHC Publication, 1995. Booklet. Provides renovators with information relating to the business aspects of renovation.	all	all	all
CMH	*Roofing and Flashing Problems – Builders' Series.* Ottawa ON: CMHC Publication, 1988. Booklet. Provides the builder with a diagnosis of common roofing and flashing problems.		2050	3040
ACC	*Step by Step Series.* Edmonton, AB: ACCESS: The Education Station. A series of 10-minute video programs that use computer graphics to help teach the fundamental principles of stair design.			3040
CMH	*Siding Problems – Builders' Series.* Ottawa ON: CMHC Publication, 1988. Booklet. Provides the builder with a diagnosis of common siding problems.		2060	
AECD	*Trade Profile.* Edmonton, AB: Alberta Advanced Education and Career Development. Provides up-to-date information on trades related to Construction Technologies.	all	all	all

ADDITIONAL SOURCES

Available to Career and Technology Studies (CTS) teachers, locally and provincially, are many sources of information that can be used to enhance CTS. These sources are available through the community (e.g., libraries, boards, committees, clubs, associations) and through government agencies, resource centres and organizations. Some sources, e.g., government departments, undergo frequent name and/or telephone number changes. Please consult your telephone directory or an appropriate government directory.

The following is a partial list of sources to consider:

TEACHER–LIBRARIANS

Planned and purposeful use of library resources helps students grow in their ability to gather, process and share information. Research activities require access to an adequate quantity and variety of appropriate, up-to-date print and nonprint resources from the school library, other libraries, the community and additional sources. Some techniques to consider are:

- planning together
- establishing specific objectives
- integrating research skills into planning.

Cooperation between the teacher-librarian and the subject area teacher in the development of effectively planned resource-based research activities ensures that students are taught the research skills as well as the subject content. Also see *Focus on Research: A Guide to Developing Student's Research Skills* referenced in the Alberta Education resources section.

ALBERTA EDUCATION SOURCES

Alberta Government telephone numbers can be reached toll free from outside Edmonton by dialing 310–0000.

The following monographs are available for purchase from the Learning Resources Distributing Centre. Refer to the Distributor Directory at the end of this section for address, telephone, fax and Internet address.

Please consult the "Support Documents" section or the "Legal, Service and Information Publications" section in the LRDC *Buyers Guide* for ordering information and costs.

Developmental Framework Documents

- *The Emerging Student: Relationships Among the Cognitive, Social and Physical Domains of Development*, 1991 (Stock No. 161555)

  This document examines the child, or student, as a productive learner, integrating all the domains of development: cognitive, social and physical. It emphasizes the need for providing balanced curriculum and instruction.

- *Students' Interactions Developmental Framework: The Social Sphere*, 1988 (Stock No. 161399)

  This document examines children's perceptual, structural and motor development and how such physical development affects certain learning processes.

- *Students' Physical Growth: Developmental Framework Physical Dimension*, 1988 (Stock No. 161414)

  This document examines children's normal physical growth in three areas: perceptual, structural and motor development. In none of these areas is the child's growth in a single continuous curve throughout the first two decades of life. Physical growth is characterized by periods of rapid growth and periods of slower growth. Consequently, differences and changes in growth patterns may affect the timing of certain learning processes.

Other

- *Focus on Research: A Guide to Developing Students' Research Skills*, 1990 (Stock No. 161802)

  This document outlines a resource-based research model that helps students manage information effectively and efficiently, and gain skills that are transferable to school and work situations. This model provides a developmental approach to teaching students how to do research.

- *Teaching Thinking: Enhancing Learning*, 1990 (Stock No. 161521)

  Principles and guidelines for cultivating thinking, ECS to Grade 12, have been developed in this resource. It offers a definition of thinking, describes nine basic principles on which the suggested practices are based, and discusses possible procedures for implementation in schools and classrooms.

ACCESS: The Education Station

ACCESS: The Education Station offers a variety of resources and services to teachers. For a nominal dubbing and tape fee, teachers may have ACCESS: The Education Station audio and video library tapes copied. ACCESS: The Education Station publishes listings of audio and video cassettes as well as a comprehensive programming schedule.

Of particular interest are the CTS videos, which are available with utilization guides. The guides outline key points in each video and suggest questions for discussion, classroom projects and other activities. Video topics are listed in the Support Learning Resources section of this guide. The videos and accompanying support material can be obtained from ACCESS: The Education Station. Refer to the Distributor Directory at the end of this section for address, telephone, fax and Internet address.

GOVERNMENT SOURCES

National Film Board of Canada (NFB)

The NFB has numerous films and videotapes that may be suitable for Career and Technology Studies strands. For a list of NFB films and videotapes indexed by title, subject and director, or for purchase of NFB films and videotapes, call 1–800–267–7710 (toll free) or Internet address: http://www.nfb.ca

ACCESS: The Education Station and some school boards have acquired duplication rights to some NFB videotapes. Please contact ACCESS: The Education Station or consult the relevant catalogues in your school or school district.

The Edmonton Public Library and the Calgary Public Library have a selection of NFB films and videotapes that can be borrowed free of charge with a Public Library borrower's card. For further information, contact:

Edmonton Public Library
Telephone: 403–496–7000

Calgary Public Library
Telephone: 403–260–2650

For further information contact:

Statistics Canada
Regional Office
8th Floor, Park Square
10001 Bellamy Hill
Edmonton, AB T5J 3B6
Telephone: 403–495–3027
Fax: 403–495–5318
Internet address: http://www.statcan.ca

Statistics Canada produces periodicals, reports, and an annual year book.

Resource Centres

Urban Resource Centres

Instructional Services
Elk Island Public Schools
2001 Sherwood Drive
Sherwood Park, AB T8A 3W7
Telephone: 403-464-8235
Fax: 403-464-8033
Internet Address: http://ei.educ.ab.ca

Learning Resources Centre
Red Deer Public School Board
4747 – 53 Street
Red Deer, AB T4N 2E6
Telephone: 403-343-8896
Fax: 403-347-8190

Instructional Materials Centre
Calgary Separate School Board
6220 Lakeview Drive SW
Calgary, AB T3E 5T1
Telephone: 403-298-1679
Fax: 403-249-3054

School, Student, Parent Services Unit
Program and Professional Support Services Sub Unit
Calgary Board of Education
3610 – 9 Street SE
Calgary, AB T2G 3C5
Telephone: 403-294-8542
Fax: 403-287-9739

After July 1, 1997, please contact the School, Student, Parent Services Unit regarding the relocation of the Loan Pool Resource Unit.

Learning Resources
Edmonton Public School Board
Centre for Education
One Kingsway Avenue
Edmonton, AB T5H 4G9
Telephone: 403-429-8387
Fax: 403-429-0625

Instructional Materials Centre
Medicine Hat School District No. 76
601 – 1 Avenue SW
Medicine Hat, AB T1A 4Y7
Telephone: 403-528-6719
Fax: 403-529-5339

Resource Centre
Edmonton Catholic Schools
St. Anthony's Teacher Centre
10425 – 84 Avenue
Edmonton, AB T6E 2H3
Telephone: 403-439-7356
Fax: 403-433-0181

Instructional Media Centre
Northern Lights School Division No. 69
Bonnyville Centralized High School
4908 – 49 Avenue
Bonnyville, AB T9N 2J7
Telephone: 403-826-3366
Fax: 403-826-2959

Regional Resource Centres

Zone 1

Zone One Regional Resource Centre
P.O. Box 6536
10020 – 101 Street
Peace River, AB T8S 1S3
Telephone: 403-624-3187
Fax: 403-624-5941

Zone 2/3

Central Alberta Media Services (CAMS)
182 Sioux Road
Sherwood Park, AB T8A 3X5
Telephone: 403-464-5540
Fax: 403-449-5326

Zone 4

Information and Development Services
Parkland Regional Library
5404 – 56 Avenue
Lacombe, AB T4L 1G1
Telephone: 403-782-3850
Fax: 403-782-4650
Internet Address: http://rtt.ab.ca.rtt/prl/prl.htm

Zone 5

South Central Alberta Resource Centre (SCARC)
Golden Hills Regional Division
435A Hwy 1
Westmount School
Strathmore, AB T0J 3H0
Telephone: 403–934–5028
Fax: 403–934–5125

Zone 6

Southern Alberta Learning Resource Centre (SALRC)
Provincial Government Administration Building
909 Third Avenue North, Room No. 120
Box 845
Lethbridge, AB T1J 3Z8
Telephone: 403–320–7807
Fax: 403–320–7817

OTHER GOVERNMENT SOURCES

Alberta Agriculture
Print Media Branch
7000 – 113 Street
Edmonton, AB T6H 5T6
Telephone: 403–427–2127
Toll Free: 1–800–292–5697
Fax: 403–427–2861

Alberta Labour
9940 – 106 Street
Edmonton, AB T5K 2N2
Telephone: 403–427–8848
Fax: 403–427–0999

Offices are also in Calgary, Camrose, Edson, Fort McMurray, Grande Prairie, Lethbridge, Medicine Hat, Red Deer and Vermilion.

Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, ON K1A 0P7
www.cmhc.schl.gc.ca

CMHC distributes a wide range of documents related to house construction.

OTHER ORGANIZATIONS

Alberta Building Trades Council
201, 11738 Kingsway Avenue
Edmonton, AB T5G 0X5

Alberta Construction Safety Association
10949 – 120 Street
Edmonton, AB T5H 3R2

Alberta Home Builders Association
205, 10544 – 114 Street
Edmonton, AB T5H 3J7

Alberta Teachers' Association
Website: www.teachers.ab.ca
Barnett House
11010 – 142 Street
Edmonton, AB T5N 2R1
Telephone: 1–800–232–7208
403–453–2411
Fax: 403–455–6481

CTS Council
Alberta Global Education Project
Science Council

American Vocational Association
1410 King Street
Alexandria, VA 22314

Canadian Construction Assocation
85 Albert Street
Ottawa, ON K1P 6A4

Canadian Vocational Association
P.O. Box 3435 Station D
Ottawa, ON K1P 6L4

International Technology Education Association
1914 Association Drive
Reston, VA 22091

Junior Achievement of Northern Alberta
(Alberta north of Lacombe, and NWT)
161, 10700 – 104 Avenue
Edmonton, AB T5J 4S2

Junior Achievement of Southern Alberta
(Lacombe and south)
739 – 10 Avenue SW
Calgary, AB T2R 0B3

Merit Contractors
10951 – 120 Street
Edmonton, AB T5H 3R2

Recycling Council of Alberta
Box 40552
Highfield Post Office
Calgary, AB T2G 5G8

Skills Canada Alberta
10035 – 102 Avenue
Edmonton, AB T5J 0E5
Telephone: 403–493–2637
Fax: 403–493–2649

DISTRIBUTOR DIRECTORY

The entries in the Distributor Directory are arranged alphabetically by code.

CODE	Distributor/Address	Contact Via
ACC	ACCESS: The Education Station 3270 – 76 Avenue Edmonton, AB T6B 2N9	403–440–7777 Fax: 403–440–8899 1–800–352–8293 http://www.ccinet.ab.ca/access
AECD	Alberta Advanced Education and Career Development 10th Floor, Commerce Place 10155 – 102 Street Edmonton, AB T5H 4L5	403–427–8765
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CONSTRUCTION TECHNOLOGIES

SECTION J: SAMPLE STUDENT LEARNING GUIDES

The following pages provide background information, strategies and a template for developing student learning guides. Also included at the end of this section are several sample student learning guides for Construction Technologies.

A student learning guide provides information and direction to help students attain the expectations defined in a specified CTS module. It is designed to be used by students under the direction of a teacher.

Many excellent student learning guides (SLGs) are available for use and/or are in the process of being developed. While Alberta Education provides a development template accompanied by some samples, most student learning guide development is being done by individuals and organizations across the province (e.g., school jurisdictions, specialist councils, post-secondary organizations). Refer to the *Career & Technology Studies Manual for Administrators, Counsellors and Teachers* (Appendix 11) for further information regarding student learning guide developers and sources.

Note: A student learning guide is not a self-contained learning package (e.g., Distance Learning Module), such as you might receive from the Alberta Distance Learning Centre (ADLC) or Distance Learning Options South (DLOS).

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SAMPLE STUDENT LEARNING GUIDES

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BACKGROUND INFORMATION

A Student Learning Guide (SLG) is a presentation of information and direction that will help students attain the expectations defined in a specified CTS module. It is designed to be used by students under the direction of a teacher. A SLG is not a self-contained learning package such as you might receive from the Alberta Distance Learning Centre (ADLC) or Distance Learning Options South (DLOS).

Each SLG is based on curriculum and assessment standards as defined for a particular CTS module. Curriculum and assessment standards are defined in this document through:

- module and specific learner expectations (Sections D, E and F)
- assessment criteria and conditions (Sections D, E and F)
- assessment tools (Section G).

The SLG is written with the student in mind and makes sense to the student in the context of his or her CTS program. SLGs are designed to guide students through modules under the direction of the teacher. They can be used to guide:

- an entire class
- a small groups of students
- individual students.

In some instances, the Student Learning Guide may also be used as teacher lesson plans. When using SLGs as teacher lesson plans, it should be noted that they tend to be:

- learner-centred (versus teacher-directed)
- activity-based (versus lecture-based)
- resource-based (versus textbook-based).

Components of a Student Learning Guide

The student learning guide format, as developed by Alberta Education, typically has *seven* components as described below.

1. *Why Take This Module?*

   This section provides a brief rationale for the work the student will do, and also establishes a context for learning (i.e., in relation to the strand, a life pursuit, a specific industry, etc.).

2. *What Do You Need To Know Before You Start?*

   In this section, prerequisite knowledge, skills and attitudes considered necessary for success in the module are identified. Prerequisites may include other modules from within the strand or from related CTS strands, as well as generic knowledge and skills (e.g., safety competencies, the ability to measure/write/draw, prior knowledge of basic information relevant to the area of study).

3. *What Will You Know And Be Able To Do When You Finish?*

   This information must parallel and reflect the curriculum and assessment standards as defined for the module. You may find it desirable to rewrite these standards in less formal language for student use.

4. *When Should Your Work Be Done?*

   This section provides a timeline that will guide the student in planning their work. The timeline will need to reflect your program and be specific to the assignments you give your students. You may wish to include a time management chart, a list of all assignments to be completed, and instructions to the student regarding the use of a daily planner (i.e., agenda book) to organize their work.

5. *How Will Your Mark For This Module Be Determined?*

   This section will interpret the assessment criteria and conditions, assessment standards, assessment tools and suggested emphasis as defined for the module within the context of the projects/tasks completed. Accepted grading practices will then be used to determine a percentage grade for the module—a mark not less than 50% for successful completion. (**Note**: A module is "successfully completed" when the student can demonstrate ALL of the exit-level competencies or MLEs defined for the module.)

6. *Which Resources May You Use?*

   Resources considered appropriate for completing the module and learning activities are identified in this section of the guide. The resources may be available through the Learning Resources Distributing Centre (LRDC) and/or through other agencies. Some SLGs may reference a single resource, while others may reference a range of resources. Resources may include those identified in the Learning Resource Guide (Section I) as well as other sources of information considered appropriate.

7. *Activities/Worksheets*

   This section provides student-centred and activity-based projects and assignments that support the module learner expectations. When appropriately aligned with curriculum and assessment standards, successful completion of the projects and assignments will also indicate successful completion of the module.

Strategies for Developing Student Learning Guides

Prior to commencing the development of a student learning guide, teachers are advised to obtain:

- the relevant Guide to Standards and Implementation
- the student learning guide template.

Information communicated to the student in the SLG must parallel and reflect the curriculum and assessment standards as defined for the module. Therefore, critical elements of the Guide to Standards and Implementation that need to be addressed throughout the SLG include:

- module and specific learner expectations
- assessment criteria and conditions
- assessment standards
- assessment tools.

Additional ideas and activities will need to be incorporated into the student learning guide. These can be obtained by:

- reflecting on projects and assignments you have used in delivering programs in the past
- identifying human and physical resources available within the school and community
- networking and exchanging ideas (including SLGs) with other teachers
- reviewing the range of resources (e.g., print, media, software) identified in the Learning Resource Guide (Section I) for a particular module/strand.

Copyright law must also be adhered to when preparing a SLG. Further information and guidelines regarding copyright law can be obtained by referring to the:

- *Copyright Act*
- *Copyright* and the *Can Copy Agreement*.

A final task in developing a student learning guide involves validating the level of difficulty/challenge/rigour established, and making adjustments as considered appropriate.

A template for developing student learning guides, also available on the Internet, is provided in this section (see "Student Learning Guide Template," pages J.5–10). Several sample student learning guides are also provided in this section (see "Sample Student Learning Guides," starting on page J.11.

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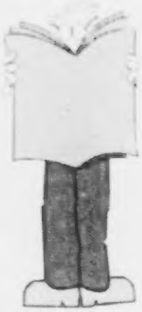
SAMPLE STUDENT LEARNING GUIDE TEMPLATE

WHY TAKE THIS MODULE?



WHAT DO YOU NEED TO KNOW BEFORE YOU START?

WHAT WILL YOU KNOW AND BE ABLE TO DO WHEN YOU FINISH?

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WHEN SHOULD YOUR WORK BE DONE?

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HOW WILL YOUR MARK FOR THIS MODULE BE DETERMINED?

	PERCENTAGE

WHICH RESOURCES MAY YOU USE?

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ACTIVITIES/WORKSHEETS

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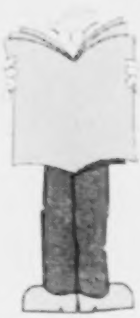
SAMPLE STUDENT LEARNING GUIDE

CON1010 Basic Tools & Materials

WHY TAKE THIS MODULE?



Ever since the beginning of the Stone Age, people have used technology to build needed artifacts and structures.
This module will:

- introduce you to common tools and materials
- help you understand the basic techniques used in building and manufacturing
- experience the satisfaction of constructing a lasting object.

WHAT DO YOU NEED TO KNOW BEFORE YOU START?

There are no prerequisites identified for this module.

However, ability to read and follow directions and willingness to work with others in a safe manner will ensure your success.

WHAT WILL YOU KNOW AND BE ABLE TO DO WHEN YOU FINISH?

Upon completion of this module you will be able to:

- identify and describe the safe use of basic hand tools
- identify and compare the properties of common materials used in construction and fabrication activities
- apply construction/fabrication processes and skills to produce a product
- demonstrate basic competencies.

WHEN SHOULD YOUR WORK BE DONE?

Your teacher will give you a timeline for completing tasks and assignments within this module.

You may also wish to use a time-management planning chart to preplan the work that needs to be done in this module. Plan how you will use your class time as well as extra time needed to complete the assignments in this module.

Be sure to review the work to be completed in this module with your teacher and allot your time so that you will be able to finish within the suggested time frame.

HOW WILL YOUR MARK FOR THIS MODULE BE DETERMINED?

	PERCENTAGE
You must first demonstrate **all** of the competencies required for this module.	
When you have done this, your percentage mark for the module will be determined as follows:	
• Tool Identification and Use Test (Hand Tools, CON1010–2)	15%
• Report on the Properties of Building Materials (Material Identification, CON1010–3)	15%
• Project Work (Project Assessment (CONPRO)	70%

WHICH RESOURCES MAY YOU USE?

- *Production Technology*. Stanley A. Komacek, 1993.
- *Technology Shaping Our World*. John Gradwell, 1993.
- *Design and Technology*. Colin Caborn, et. al., 1989.

ACTIVITIES/WORKSHEETS

1. Technological System

1.1 People create technological systems to help solve problems. A system often includes these parts: input, process output and feedback. Select a simple household item and identify what:
- input information and resources were required to make the product
- processes were used to manufacture the product
- were the intended and unintended outcomes
- feedback the manufacturer might need to know to improve the product and the production process

1.2 Explain the difference between an open and a closed technological system.

2. Properties of Materials

2.1 Designers and builders make choices about what materials they are going to use based on availability of the material, its cost and properties. Identify the cost and availability of five materials commonly used in building structures and products

2.2 Properties of materials tell how a material can be expected to perform during and after construction/fabrication. Identify a simple test that can be used to determine:
- a mechanical property
- a material's reaction to heat
- how chemicals affect the material
- its optical qualities
- its electrical and magnetic properties.

3. Tool and Equipment Identification

As you work with technology, you will need to select the correct hand and power tools, and use these tools in a safe manner.

3.1 Identify and describe the use of two or more tools that can be used safely to:
- measure
- mark a surface
- cut through a material
- smooth a material
- form a material
- hold a material
- install a fastener
- apply a finish.

4. Construction and Fabrication Process

4.1 Complete the following activities in consultation with your teacher:
- Choose a simple artifact or structure that can be made from common building materials
- Locate a set of plans and a set of procedures that will help you build the product
- Identify and locate the appropriate materials and tools that are required to make the project.

4.2 The purpose of this activity is to design and build a matching set of structures. One structure will be built using Imperial measurements and the other using SI units of measurement. When you are finished constructing these structures you will be asked the following questions:
- Which system of measurement was easier to use?
- Which system achieved the greatest accuracy?
- What design features did you build into your plan to add strength to your structure?

Structures to consider constructing are a set of:
- book ends
- shelf brackets
- "c" clamps.

Evaluation

Your marks for these activities will be based on:
- how well you plan and manage your project
- the work skills you develop and apply
- your project work
- presentation of your project

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SAMPLE STUDENT LEARNING GUIDE

CON2010 Site Preparation

WHY TAKE THIS MODULE?

Extra care and attention must be given to the proper location and excavation of a building site. By taking this module you will be able to:

- interpret a site plan
- prepare an application for a building permit
- survey a building site
- prepare a site for construction.

WHAT DO YOU NEED TO KNOW BEFORE YOU START?

Prerequisite: CON1070: Building Construction

In addition, to successfully complete this module you will need print reading skills, a knowledge of geometry, and be able to measure and calculate accurately.

WHAT WILL YOU KNOW AND BE ABLE TO DO WHEN YOU FINISH?

Upon completion of this module you will be able to:

- identify and describe typical building site layout and excavation processes
- complete an application for a building permit
- apply site preparation skills to assist in the location of building site lines and features
- demonstrate basic competencies.

WHEN SHOULD YOUR WORK BE DONE?

Your teacher will give you a timeline for completing tasks and assignments within this module.

You may also wish to use a time-management planning chart to preplan the work that needs to be done in this module. Plan how you will use your class time as well as extra time needed to complete the assignments in this module.

Review the work to be completed in this module and allocate your time accordingly.

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HOW WILL YOUR MARK FOR THIS MODULE BE DETERMINED?

	PERCENTAGE
You must first demonstrate **all** of the competencies required for this module. When you have done this, your percentage mark for the module will be determined as follows:	
• Research on-site layout and excavation procedures (Preparing a Building Site, CON2010–1)	15%
• Preparation of a building permit	15%
• Building site layout activities	60%
(Building Site Layout, CON2010–2)	10%

WHICH RESOURCES MAY YOU USE?

- *Building Construction Technology*. Kenneth F. Cannon, 1982.
- *Modern Carpentry*. Willis H. Wagner, et. al, 1996.
- *Alberta Building Code*. Alberta Government.
- *Illustrated Residential and Commercial Construction*. Peter A. Mann, 1989.

ACTIVITIES/WORKSHEETS

1. Prepare a Building Permit

   1.1 Before starting construction, a sample building permit must be obtained:

   - Explain the purpose of building permit
   - List the information that is required to complete an application for a permit

   1.2 Given a set of drawings, prepare an application for a building permit in your locality

   1.3 Once a permit has been given, identify the types and number of inspections that must be carried out as the construction progresses.

2. Site Survey

   A typical site plan shows the location of a building on a lot. It is the responsibility of the surveyor to relate the existing features of the lot. The finished elevation and other features are the responsibility of the architect or designer.

   2.1 Given a site plan, assist in the:
   - measurement and location of lot boundaries
   - location of all setbacks
   - setting out of the exact location of the building
   - location of the batterboards

   2.2 Determine the amount of soil that is to be excavated from the building site.

3. Site Preparation

   3.1 A builder's level or transit is often used to level a building site:
   - identify the parts of a builder's level
   - describe the procedure used to level a site

   3.2 It is important that building features are level and square to one another:
   - describe a system of laying out right angles and checking for overall squareness
   - check the level and location of all survey stakes.

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SAMPLE STUDENT LEARNING GUIDE

CON3040 Stair Construction

WHY TAKE THIS MODULE?

Constructing a set of stairs seems difficult but with a little study and work it can be easily accomplished. By taking this module, you will be able to:

- build and gain confidence in your carpentry skills
- use mathematics to help solve a construction problem
- acquire a skill that can be used in daily living or in the workplace.

WHAT DO YOU NEED TO KNOW BEFORE YOU START?

Prerequisite: CON1070: Building Construction

In addition, to be successful in this module you will need to understand basic geometry, layout procedures and demonstrate the safe use of hand and power tools.

WHAT WILL YOU KNOW AND BE ABLE TO DO WHEN YOU FINISH?

Upon completion of this module you will be able to:

- identify and describe different stair types, component parts and construction techniques
- interpret building code regulations pertaining to residential stair design
- design, lay out and construct a straight flight of stairs
- demonstrate basic competencies.

WHEN SHOULD YOUR WORK BE DONE?

Your teacher will give you a timeline for completing tasks and assignments within this module.

You may also wish to use a time-management planning chart to preplan the work that needs to be done in this module. Plan how you will use your class time as well as extra time needed to complete the assignments in this module.

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HOW WILL YOUR MARK FOR THIS MODULE BE DETERMINED?

	PERCENTAGE
You must first demonstrate **all** of the competencies required for this module. When you have done this, your percentage mark for the module will be determined as follows:	
• Research on stair types and construction techniques (Stair Construction, CON3040–1)	15%
• Interpretation of building codes and stair design	15%
• Practical activities (Activity Assessment, CON3040–2)	70%

WHICH RESOURCES MAY YOU USE?

- *Building Construction Technology*. Kenneth F. Cannon, 1982.
- *Modern Carpentry*. Willis H. Wagner, et. al., 1996.
- *Alberta Building Code*. Alberta Government.
- *Illustrated Residential and Commercial Construction*. Peter Mann, 1989.

ACTIVITIES/WORKSHEETS

1. Stair Design

The basic function of a set of stairs is to provide access to different floors or surface levels. Some stairs, like a set of basement stairs, are designed for function only, while others in living areas are used to add style and character to the space.

1.1 Identify and describe the types of stairs that are commonly used in residential construction.

1.2 Explain the difference between a housed stringer and a carriage stringer, and identify the advantages and disadvantages of each type of stringer.

1.3 In relation to these basic types of stringers, explain how the vertical spaces between treads can be filled in and nosing features added.

2. Stair Code

2.1 Name the parts of a typical straight flight stair layout and identify, according to local code requirements, the:
- appropriate stair angle, tread run and rise for a given application
- minimum stairwell opening and headroom

2.2 Identify the parts of typical balustrade and the codes related to their construction.

3. Stair Design and Construction

Use the following specification to design and build a model set of stairs

Total Rise:	340 mm
Total Run:	360 mm
Stair Width	400 mm
Tread & Stringer Thickness	15 mm
Riser Thickness	12 mm
Nosing	15 mm

3.1 Having the riser as close to 80 mm as possible, calculate:
- The number of risers @ mm
- The number of runs @ mm

3.2 Using a 1:2 scale, draw an orthographic projection of the calculated stairs, showing dimensions and labeling all parts

3.3 Do a material and cost estimate for the model stairs

3.4 Submit your calculation, drawings and estimate to your teacher

3.5 Construct the model according to your project plan.

CON3040 Stair Construction

Evaluation Criteria

- Planning and management skills
- Construction techniques
- Use of equipment and materials
- Teamwork

K. ACKNOWLEDGEMENTS

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